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Commission canadienne des transports

MULTIMODAL TRANSPORT IN CANADIAN INTERNATIONAL TRADE

Canada

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ERRATA

PAGES	
7	Section 2.3.6, line 5: "(29 000)" should read"(39 000)".
7	Section 2.3.8, second paragraph, line 2: "57" should read "58".
10	Summary Table, box 4, line 1: "Blocks" should read "Blocs".
29	Section 5.1.1, lines 5 and 6: read "...Canadian domestic exports and imports (excluding Special transactions, trade) in 1979 to be 64.0 billion dollars [5, p. 4] and 62.2 billion dollars...".
34	Table 3, under Totals, estimate column, overseas entry: "12 256" should read "13 256".
40	Table 7, under Multimodal Movements, confidence intervals, min. column, Overseas, line 2: "782" should read "682".
55	Section 6.11.2, line 8: "95 percent" should read "93 percent".
58	Second paragraph, line 7: "115 000" should read "114 000".
61	Line 4: "31" should read "10".
63	Table 21, title of fourth box should be: "Diversions or Transits as a Percent of Total Value of Multimodal Trade".
63	Table 21, title of fifth box should be: "Diversions or Transits as a Percent of Total Value of Trade".

October 6, 1982

MULTIMODAL TRANSPORT

IN CANADIAN INTERNATIONAL TRADE

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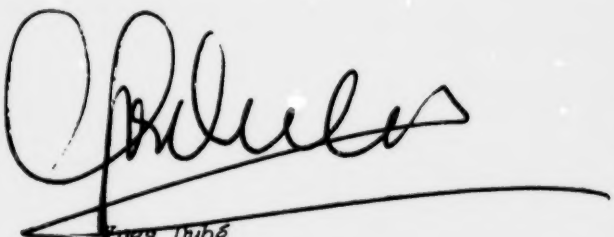
FOREWORD

The recent adoption of the United Nations Convention on the International Multimodal Transport of Goods has created a burgeoning interest in the use of "through" transport in the movement of Canadian goods in international trade. Although much work on the impact of such a Convention still remains to be done, obtaining an idea of the magnitude of Canadian international trade likely to be affected was seen as a prerequisite to any more focussed impact work.

The main objective of this study was to estimate the relative proportion, by value and number of shipments, of Canadian exports and imports moving multimodally in 1979. Major emphasis in the study has been placed on the design of a methodology and selection of a suitable data base which, when combined, would provide the reader with an indication of the relative importance of the use of multimodal transport in Canadian international trade. To the extent that no figures of this nature have previously been produced, the efforts described in the ensuing text represent original work in the area.

The study was initially undertaken at the request of the Water Transport Committee of the Canadian Transport Commission. It is also expected that the results will be useful to the Interdepartmental Committee on Multimodal Transport which was established under the chairmanship of Transport Canada in late 1980 to develop a Canadian position on this issue.

The views expressed in this report do not necessarily reflect those of the Canadian Transport Commission.



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(Research)

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The CTC (Research) study team would like to acknowledge the valuable contributions made by personnel of two organizations during the course of the study. Specifically, debts of gratitude are due: Charlie Doddridge, Marc Coté and other clerks of the External Trade Division of Statistics Canada for providing the data base for the study as well as the personnel to undertake, under contract to the CTC, the task of manually linking the sampled computer file transactions to their respective Customs documents and coding the required information. The study owes much also to Mukund Nargundkar and Gerry Shane of Census and Household Survey Methods of Statistics Canada who undertook, again under contract, to develop the sampling methodology and, in combination with the data base, to generate the estimates to meet the objectives of this study.

The task of producing this report fell to CTC (Research) and the responsibility for all material included in the report remains solely with the study team.

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Chapter 1

INTRODUCTION

1.1 Background

The widespread and constantly escalating use of containers in international trade, in the past two decades, has been closely followed by the development and growth of the concept of the through movement of goods frequently employing more than one mode of transport. In an effort to meet the needs of shippers all over the world for more economical and efficient multimodal transport services as well as to establish specific rules related to the carriage of goods by means of international multimodal contracts[7]*, the final articles of a Convention on the International Multimodal Transport of Goods were adopted by the United Nations Conference on International Multimodal Transport of Goods on May 24, 1980. This Convention is intended to provide a unified legal regime for certain through transport movements in international trade.

It is expected that the adoption of this new Convention may well give rise to a number of studies in those nations (as well as various international organizations) most interested in the possible impact of such a development on their respective shippers, transport sectors and international trade in the eventuality that the new legislation would enter into force. Canada, as one such nation, has undertaken to study the issue intensively with a view to supplementing work done on previous Convention drafts.

The mandate for this study originates from the need to develop a definitive Canadian position based on an assessment of the perceived costs and benefits to Canada of implementing the provisions of such a Convention. Originally, it was envisioned that, if the impact of such a development were to be evaluated intelligently, some preliminary studies, essential to a complete understanding of the question, must first be undertaken as precursors of the more focussed impact work. As very little was known of the extent to which multimodal transport is presently employed in Canadian international trade, it was reasoned that an investigation focussing on this subject would be an appropriate starting point.

This study is one of several studies initiated within the Research Branch of the Canadian Transport Commission dealing with issues related to the Convention and which, it is anticipated, will provide much of the basis for evaluating, in a Canadian context, the relative merits and deficiencies of the Convention on International Multimodal Transport of Goods.

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* Numbers in square brackets refer to the work as listed in the Bibliography.

1.2 Purpose

This study seeks to determine the extent of use of multimodal transport* in Canadian international trade in 1979. Determining the relative proportion of goods moving multimodally could give some insight into the scale of the likely impact of the Convention on Canadian international trade and, at the same time, provide a base for further research, as required, on related issues.

Specifically, the study proposes:

1. to estimate the proportion, by number of shipments** and by value,*** of Canadian trade moving multimodally (as opposed to unimodally) across the Canada-U.S. border and to and from points overseas;

2. to estimate the proportion, by number and value, of shipments of goods being moved multimodally by major commodity groups;****

3. to estimate the number of shipments and value of trade associated with multimodal movements by country of origin***** (in the case of overseas import trade), U.S. state of origin (in the case of transborder import trade), country of

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* Generally speaking multimodal transport is defined in the Convention as being movement by more than one mode of transport excluding pick-up and delivery services. For a more precise definition and a detailed discussion of the concept of "multimodal" transport, see Section 4.1 of this report.

** This measure corresponds to commodity transactions sampled from the computerized commodity transactions file of the External Trade Division of Statistics Canada which were linked manually to the original Customs Invoice (in the case of imports) or B-13 (in the case of exports) forms upon which they appear. In some cases, the systematically sampled commodity was one of several on the original Customs document. Examples of multiple commodities in a shipment appeared more frequently on the import side while, on the export side, the commodity sampled was often the only commodity listed on the Customs document.

*** The selling price for individual commodities expressed in Canadian dollars (in the case of exports) or a Canadian dollar equivalent (in the case of imports) and appearing on Customs Invoice and B-13 forms.

**** Estimates were produced for five major commodity groups as per External Trade's X.C.C. (Exports) and M.C.C. (Imports) Commodity Classifications (i.e. Live Animals; Food, Feed, Beverages and Tobacco; Crude Materials, Inedible; Fabricated Materials, Inedible; and End Products, Inedible).

***** Estimates of proportions, by number of shipments and value, for exports and imports were generated at the level of country blocs (e.g. Western Europe, South America, Soviet Bloc, etc.) in the case of overseas trade and the level of the region (e.g. Northeast, Northwest, South Central, etc.) in the case of transborder trade.

destination (in the case of overseas export trade) and U.S. state of destination (in the case of transborder export trade); and

4. to estimate the proportions of combinations of modes of transport (e.g. sea-rail, sea-air, air-road, etc.) employed in multimodal movements, in terms of number and value, of total multimodal transport movements.

In addition, where multimodal shipments do not move directly from the "initial" origin of the goods to the final destination, an attempt was made to estimate the proportions, again by number and value, of these movements transiting another country* or U.S. state (in the case of transborder trade).

1.3 Scope

Although theoretically possible, the determination of the value and number of shipments moved by more than one mode of transport as a proportion of the total value and number of shipments moving in Canadian international trade in 1979 using all available data was not considered to be feasible given project resource constraints and the fact that the External Trade Division receives well over 80 000 [3] Customs documents (data source for the study) a month. Instead, it was decided to estimate the extent of use of multimodal transport based on a probability sample of the total number of export and import documents received by External Trade for the calendar year 1979.

It was also anticipated that the extent of use of multimodal transport was likely to vary for Canada-U.S. trade (referred to as transborder trade) as compared to Canadian trade with all other countries (referred to as overseas trade); consequently, estimates of the multimodal portion of total Canadian trade in 1979 were produced for both transborder and overseas trade separately.

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* For example, consider a movement of goods by rail from Bolivia to Peru and, by water, from Peru to Canada. Although the country of origin of the goods is Bolivia and the country of final destination is Canada, Peru, in this example, is the country through which the goods were transshipped before arriving at the final destination. In the case of a movement of goods from West Germany to the U.S. by water and from the U.S. to Canada by road, West Germany is the country of origin, Canada, the country of destination and the U.S. the country transited by the goods. In addition, in the case of Canadian inbound or outbound cargo diverted through the U.S., the last state through which the goods passed before entering Canada or leaving for overseas was noted and its frequency of appearance estimated.

Bulk commodities* were not included in the sample frame since much more is known of the methods and modes employed in the movement of these goods, and, there remained a more pressing need for information pertaining to the modes or combination of modes used in the transport of break-bulk and containerized commodities in Canadian trade.

Finally, commodities selected for inclusion in the sample were not solely limited to those commodities cleared through the major Canadian seaports; but, rather, commodities cleared at inland points in Canada as well as at major border crossings (in the case of transborder trade and transshipments) were also included in the sample.

1.4 Presentation of Findings

In describing the findings of the study in ensuing sections, only estimates of commodities moving multimodally, along with their associated coefficients of variation (indicating the degree of reliability of the estimates) are highlighted but all estimates in conjunction with their coefficients of variation and confidence intervals appear, in detail, in the tables throughout the text. This approach has been taken to avoid confusion in the presentation. Moreover, because of the variation in the reliability of estimates produced, attention should be focussed on the confidence intervals calculated for each estimate rather than the estimate itself as they provide a more precise indication of the relative proportions of trade moving multimodally by defining the actual range in which the true figures lie.

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* Although bulk commodities are not categorically excluded from the scope of the Convention, and indeed have been moved with greater frequency, in recent years, within the confines of containers, the problems presented in attempting to accurately determine whether or not goods of this nature are transported multimodally on a "through" basis, given that such commodities are normally stored at the port of exit and/or entry for extended periods of time, made the inclusion of these goods in the target population an infeasible proposition considering temporal and monetary constraints. It is suggested that this question be dealt with in a separate study. For a list of those export and import bulk commodities excluded from the sample, see Appendices A and B respectively.

Chapter 2

SUMMARY OF FINDINGS

Until now there has been no comprehensive attempt to assess the proportion of Canadian trade that is likely to be affected by the implementation, in Canada, of the provisions of the Convention on the International Multimodal Transport of Goods. In seeking to provide a basis for such an assessment, a viable methodology was developed and applied to the latest available data. The results are extensive and are described in detail in the accompanying text and tables of the report. However, those findings of a major nature are summarized below, in both written and tabular form, for the reader's convenience.

2.1 Meaning of Multimodal Transport in the Context of Study Results

Estimates of that portion of Canadian trade referred to in the findings of the report as moving multimodally are based on a consideration of physical multimodal movements as opposed to contractual multimodal movements. This is primarily due to the fact that Customs documents, rather than contracts of carriage (e.g. bills of lading), were utilized as a data base. As well, study results represent an estimate of the minimum potential proportion of Canadian trade moving multimodally that could be affected by the implementation of the Convention on the International Multimodal Transport of Goods. Furthermore, as the data employed in the study applied to the 1979 calendar year, it is more than likely that the proportion of trade moving multimodally may have risen to some extent over the past two years especially in light of the continuing growth of the through transport concept.*

2.2 Caveats Associated with Study Findings

It should be mentioned here that, in order to estimate as accurately as possible that portion of Canadian international trade transported by various modal combinations in 1979, every effort was made at the outset of the study to employ pertinent definitions (e.g., of multimodal transport) which paralleled, as closely as possible, those stipulated in the Convention text. However, problems primarily related to the degree of specificity of the data made this task difficult, and, although it is felt that the results provide the reader with a good indication of the relative importance of the use of multimodal transportation in the movement of Canadian exports and imports, there remains some scope for arguing that estimates produced here may still vary, to some extent, from the true

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* This excludes of course pick-up and delivery service.

figures. Therefore, to insure that the limitations associated with the present study results are fully understood, the reader is directed to the detailed report for further explanation and clarification.

2.3 Principal Findings of the Study

2.3.1 Use of Multimodal Transport in Total Canadian International Trade in 1979 (Exports and Imports Combined)

When Canadian trade in exports and imports are combined, the figures reveal that movements using various modal combinations accounted for less than one-fifth (16%) of the total value of goods being moved in Canadian international trade in 1979. In terms of the number of shipments, the proportion was even less, with multimodal transport being used in just under 13 percent of the total number of shipments (see Box 1 of the Summary Table or Section 6.3).

2.3.2 Incidence of Multimodal Transport in Transborder and Overseas Export Trade Combined

When transborder movements are combined with overseas movements in Canadian export trade, goods transported via a combination of modes accounted for some 15 percent (5.2 billion $) of the total value and 12 percent (153 000) of the total number of shipments in 1979 (see Box 2 of the Summary Table or Section 6.1.2).

2.3.3 Incidence of Multimodal Transport in Transborder and Overseas Import Trade Combined

When Canadian transborder import trade was combined with overseas import trade, estimates revealed that single mode movements still dominated total import trade by a considerable margin accounting for 82 percent (29.6 billion $), by value, and 87 percent (2 480 000) of the total number of shipments in 1979. Movements employing modal combinations accounted for only 18 percent of the total value and 13 percent of the total number of shipments in total import trade in the same year (see Box 7 of the Summary Table or Section 6.2.2).

2.3.4 Use of Multimodal Transport in Aggregate Transborder Trade (Exports and Imports Combined)

When the use of multimodal transport is considered in the context of total transborder trade (exports and imports combined), 5 percent of the total value and 4 percent of the total number of shipments were estimated to be moving multimodally (see Box 1 of the Summary Table).

2.3.5 Use of Multimodal Transport in Aggregate Overseas Trade (Exports and Imports Combined)

In contrast to figures produced for aggregate transborder trade, multimodal movements accounted for 38 percent of the value and 40 percent of the total number of shipments moving in overseas trade in 1979 (see Box 1 of the Summary Table).

2.3.6 Use of Multimodal Transport in Canadian Export Trade

Canadian overseas exports, moving multimodally in 1979, totalled 4.4 billion dollars (33.2% of the total value) and 114 000 shipments (43.2% of the total number of shipments) but transborder exports moving by various modal combinations were considerably less, accounting for a mere 3.7 percent, of both value (802 million $) and number (29 000), of all export shipments of this nature (see Box 2 of the Summary Table).

2.3.7 Use of Multimodal Transport in Canadian Import Trade

An examination of import trade revealed findings similar to those for exports including the variation in the proportion of overseas and transborder trade moving by modal combinations. In overseas import trade, modal combinations were employed in 38.5 percent of the total number of shipments, also accounting for 43.3 percent of the total value. In terms of transborder trade, the comparable figures for multimodal transport were 4.9 percent of the number and 6.8 percent of the value of all transborder shipments in 1979 (see Box 7 of the Summary Table).

2.3.8 Commodities Transported Multimodally

a) Export Trade

In terms of total multimodal movements, multimodal transport was employed more frequently in the movements of "Fabricated Materials" (i.e. a value of 318 million $) and "End Products" (a value of 282 million $) in transborder export trade in 1979 than in the movements of all other commodity types. Goods classified in these two groups transported by various modal combinations comprised 75 percent of the value and 72 percent of the number of all multimodal movements. In terms of total movements, however, only 2.3 percent, by number and value, of all commodities classified as "Fabricated Materials" and 4.8 percent and 5.4 percent, by number and value respectively, of those commodities labelled "End Products" were moved by more than one mode of transport in transborder trade in 1979.

In overseas trade, "Fabricated Materials" and "Crude Materials" dominated those commodities moved multimodally accounting for 57 percent, by value, and 42 percent, by number, of the movements of all commodities transported by various modal combinations in 1979. In contrast to transborder exports, however, substantially greater proportions of these two

commodity groups (47% of the number and 24% of the value of "Fabricated Materials" and 59%, by value, and 44%, by number, of the shipments of "Crude Materials") were found to be transported multimodally in total overseas trade in 1979 (see Box 3 of the Summary Table).

b) Import Trade

In both transborder and overseas import trade, goods classified as "Fabricated Materials" and "End Products" moving by combinations of modes comprised 87 percent (in transborder trade) and 84 percent (in overseas trade) of the value of all goods moving multimodally. In terms of total movements, however, unimodal movements continued to prevail, comprising 96.5 percent of the value of "Fabricated Materials" and 91.8 percent of the value of "End Products" in all transborder trade movements and 58.4 percent of the value of the former commodities and 55.8 percent of the value of the latter commodities in overseas trade. (See Table 9 or Box 8 of the Summary Table).

2.3.9 Importance of Multimodal Movements of Commodities to and from Various Country Blocs

a) Export Trade

Overseas export trade was dominated by movements to those countries comprising Europe and Asia while movements in transborder export trade were destined primarily for the North Central and Northeast regions of the U.S. Multimodal movements, as a proportion of the total value of all overseas export movements to the aforementioned areas, comprised 30.6 percent of the movements to Europe and 27.7 percent of those to Asia. Again, as was the case for transborder imports, the proportion of multimodal movements to both the North Central and Northeast regions of the U.S. was substantially lower than for overseas movements, accounting for 7 percent in the former case and 2.4 percent in the latter case of the total value of all movements to these regions (see Box 4 of the Summary Table).

b) Import Trade

As in the case of exports, goods from countries comprising Europe and Asia dominated the estimates of Canadian overseas import trade and estimates of import movements in transborder trade indicated the predominance of goods originating from the North Central and Northeast regions of the U.S. Results of the study revealed that 40.7 percent of the value and 35 percent of the number of shipments of commodities originating from Europe and 46.1 percent of the value and 43 percent of the number of those originating from Asia moved to final destinations in Canada via more than one mode of transport. Unlike overseas imports, goods moving multimodally and originating in the North Central and Northeast regions of the U.S. accounted for a meagre 9 percent and 5.2 percent respectively of the value of all goods originating from these two regions and destined for Canada (See Box 9 of the Summary Table).

2.3.10 Modal Combinations Employed in Canadian International Trade

a) Export Trade

Of major importance in the study was the determination of the frequency of use of various combinations of modes in the movement of goods in Canadian international trade. On the export side, the water-road (73.4% of the value and 71.1% of the number of shipments) and the water-rail (16.8% of the value and 10.5% of the number of shipments) combinations were used most often in overseas export trade while rail-road (74.3% of the value and 61.5% of the number of shipments) and water-road combinations (15% of the value and 25.6% of the number of shipments) were estimated to be most frequently employed in transborder export trade (see Box 5 of the Summary Table).

b) Import Trade

On the import side, estimates revealed that the water-road (54.5% of the value and 54.6% of the number of shipments) and water-rail (28.4% of the value and 23.3% of the number of shipments) combinations were the most frequently employed in overseas trade and that the road-unknown (31.4% of the value and 46.2% of the number of shipments) and air-road (22.3% of the value and 11.3% of the number of shipments) combinations were utilized more often in transborder import trade (see Box 10 of the Summary Table).

2.3.11 Transiting and Diversion of Canadian Overseas Cargo

a) Exports

Estimates revealed that 45 000 shipments with a value of just over 1 billion dollars were diverted through the U.S. before arriving at final destinations overseas. Diverted overseas cargo accounted for close to 24 percent of the total value and 39 percent of the total number of multimodal shipments in 1979; however, in terms of the value and number of all* Canadian overseas export shipments in 1979, those diverted accounted for a meagre 7.8 percent by value, and 16.9 percent by number of shipments, of these totals (see Box 6 of the Summary Table).

b) Imports

With reference to Canadian imports, 36 000 shipments with a corresponding value of 602 million dollars were either diverted or transited another country on their way to final destinations in Canada. Of these

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* This does not include those commodities excluded from the target population.

USE OF MULTIMODAL TRANSPORT IN CANADIAN INTERNATIONAL TRADE

Summary Table

1. Combined Canadian Export and Import Trade - 1979

	Transborder	Overseas	Aggregate*
Estimated total value	46.8 billion $	24.2 billion $	71.0 billion $
Estimated total number of shipments	3 228 000	945 000	4 173 000
Percent multimodal:			
by value	5	38	16
by number	4	40	13

2. Exports - 1979

	Transborder	Overseas	Aggregate*
Estimated total value	21.6 billion $	13.3 billion $	34.9 billion $
Estimated total number of shipments	1 061 000	264 000	1 325 000
Percent multimodal:			
by value	3.7	33.2	15
by number	3.7	43.2	12

3. Export Commodity Groups - 1979

	Transborder			Overseas	
	Value-% Multimodal	Number-% Multimodal		Value-% Multimodal	Number-% Multimodal
Fabricated materials	2.3	2.3	Fabricated materials	23.8	46.9
End products	5.4	4.8	Crude materials	59.0	43.5
Food, feed, beverages & tobacco	8.7	7.9	End products	45.7	34.8
Crude materials	9.2	8.2	Food, feed, beverages & tobacco	25.1	56.3
Live animals	-	-	Live animals	26.5	N/C

4. Exports: Country Blocks - 1979

	Transborder			Overseas	
U.S.A.	Value-% Multimodal	Number-% Multimodal		Value-% Multimodal	Number-% Multimodal
North Central	7.0	5.8	Europe	30.6	34.5
Northeast	2.4	3.3	Asia	27.7	55.3
Southeast	5.0	2.6	South America	45.7	50.0
Midwest	7.4	2.7	Middle-East	66.4	77.8
Southwest	1.2	4.3	Africa	66.9	44.4
Northwest	0.8	N/C	Mexico, Central America & West Indies	30.2	40.4
			Pacific Islands	26.7	43.8
			Soviet Bloc	86.0	50.0

5. Exports: Modal Combinations - 1979

	Transborder			Overseas	
	Value-% Frequency of Use	Number-% Frequency of Use		Value-% Frequency of Use	Number-% Frequency of Use
Rail-road	74.3	61.5	Water-road	73.4	71.1
Water-road	15.0	25.6	Water-rail	16.8	10.5
Air-road	6.1	10.3	Air-road	6.7	14.0
Water-rail	3.1	2.6	2+ Modes	1.6	1.8
Water-unknown	1.5	N/C	Water-unknown	1.4	2.6
			Air-rail	0.04	N/C
			Road-unknown	0.02	N/C
total %	100.0	100.0	total %	100.0	100.0

6. Exports: Commodity Movements - 1979

	Transborder Transiting**	Overseas Diverted*** & Transiting**
As % of value of multimodal trade	-	23.6
As % of number of shipments in multimodal trade	-	39.0
As % of total value of trade	51.0	7.8
As % of total number of shipments	52.7	16.9

* Transborder and overseas trade combined.
** Goods moving through a state or country other than that of initial origin or final destination.
*** Canadian exports and imports routed through the U.S. on their way to destinations overseas (exports) or in Canada (imports).

Summary Table (cont'd)

7. Imports - 1979

	Transborder	Overseas	Aggregate*
Estimated total value	25.2 billion $	10.9 billion $	36.1 billion $
Estimated total number of shipments	2 167 000	681 000	2 848 000
Percent multimodal:			
by value	6.8	43.3	18
by number	4.9	38.5	13

8. Import Commodity Groups - 1979

	Transborder			Overseas	
	Value-% Multimodal	Number-% Multimodal		Value-% Multimodal	Number-% Multimodal
End products	8.2	6.1	End products	44.2	37.2
Fabricatd materials	3.5	2.4	Fabricated materials	41.6	42.5
Food, feed, beverages & tobacco	7.0	1.8	Food, feed, beverages & tobacco	42.2	37.5
Crude materials	7.0	12.2	Crude materials	49.0	40.0
Live animals	6.3	N/C	Live animals	-	-

9. Imports: Country Blocs - 1979

	Transborder			Overseas	
U.S.A.	Value-% Multimodal	Number-% Multimodal		Value-% Multimodal	Number-% Multimodal
North Central	9.0	5.9	Europe	40.7	35.0
Northeast	5.2	5.0	Asia	46.1	43.0
Midwest	15.8	6.2	Soviet Bloc	64.9	52.6
Southwest	6.2	6.7	Mexico, Central America & West Indies	37.4	27.8
Southeast	1.9	1.0	Pacific Islands	50.5	34.0
Northwest	-	-	South America	24.7	17.5
			Middle East	72.7	50.0
			Africa	100.0	100.0

10. Imports: Modal Combinations - 1979

	Transborder			Overseas	
	Value-% Frequency of Use	Number-% Frequency of Use		Value-% Frequency of Use	Number-% Frequency of Use
Road-unknown	31.4	46.2	Water-road	54.5	54.6
Air-road	22.3	11.3	Water-rail	28.4	23.3
Rail-unknown	16.8	1.9	Water-unknown	10.3	7.3
Water-road	12.4	9.4	Air-road	3.1	7.6
Rail-road	11.7	10.4	2+ Modes	2.5	2.7
Air-unknown	3.9	14.2	Rail-unknown	0.5	0.4
Air-rail	0.8	2.8	Air-rail	0.2	1.1
2+ Modes	0.7	3.8	Water-air	0.2	0.4
			Air-unknown	0.1	1.1
			Rail-road	0.1	0.4
			Road-unknown	0.1	1.1
total %	100.0	100.0	total %	100.0	100.0

11. Imports: Commodity Movements - 1979

	Transborder Transiting**	Overseas Diverted*** & Transiting**
As % of value of multimodal trade	-	12.7
As % of number of shipments in multimodal trade	-	13.7
As % of total value of trade	44.3	5.5
As % of total number of shipments	40.7	5.3

NOTES: 1. For detailed estimates, see Tables 3 to 22.
2. Commodity groups, country blocs and modal combinations were ranked, in descending order, according to the absolute value of trade in each category, moving multimodally.
3. N/C - indicates that trade in the category was too small to measure after rounding.

totals, diversions* through the U.S. accounted for close to 66 percent, by value, and 56 percent of the total number of shipments; goods transiting other countries, on their way to Canada, comprised the difference. Diversions and transits combined accounted for 12.7 percent of the value and 13.7 percent of the total number of shipments of all multimodal import cargo in 1979 but only 5.5 percent by value and 5.3 percent by number of all import shipments in the same year (see Box 11 of the Summary Table).

2.3.12 Other Findings

Additional findings, including those pertaining to states transited by Canadian transborder exports and imports, as well as estimates of transborder exports and imports in automobiles and their parts moving multimodally can be found in detail in Chapters 6 and 7 of the report.

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* Diversions of Canadian import cargo especially through the U.S. port of Seattle have most likely been underestimated because in many cases, references to movements through Seattle do not appear on Customs documents.

Chapter 3

METHODOLOGY

3.1 Selection of a Data Base for the Study

Several sources of data were investigated in light of the established objectives of the study. The ideal data source for determining the mode(s) of transport employed in the movement of any shipment along with the shipment's value and its description would have been a combination of bills of lading of various modal carriers (giving information on routing patterns and the actual mode or modes used in the movement) and the respective Customs documents (B-13s or Customs Invoices) associated with these movements (providing data on commodity type, origin and destination and commodity value). But this combination was rapidly dismissed as a possible data base as there is no known link of Customs documents to their respective bills of lading (air waybills, etc.).

Bills of lading alone were also considered as a possible data source for the study, but, as commodity value was an essential variable in the presentation of the results and since transport documents do not normally contain information on the value of individual commodities,* they were also eliminated as a possible data source.

The process of elimination led to a consideration of Customs documents as a viable data source. With the aid of Statistics Canada's External Trade Division, a small sample of B-13 (exports) and Customs Invoice (imports) forms were examined to discern whether or not the actual mode or modes of transport employed in the movements of these goods were noted on the forms or could be determined from information on the forms. The analysis indicated that the necessary information was present on Customs documents** although it was evident that, with respect to certain types of movements, using these forms would lead to some operational problems (See Chapter 5).

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* Only in the case where the shipper or consignee declares a value for the shipment for insurance or liability purposes does this figure appear on the bill of lading and even then this "declared" value may or may not be the "true" value of the goods.

** Another advantage of using Customs documents as a data source is that, theoretically, they represent all international trade transactions completed in a calendar year and reflect the use of actual modes of transport (in their relative proportions) in movements. Thus one need not be concerned about a possible omission of shipments employing certain modes. This appears to be an easier approach to the problem than attempting to sample bills of lading of all the various modes of transport.

Thus a decision was made to use Customs documents* as the data base for the study; for, in most cases, the B-13 forms for exports and the Customs Invoices for imports, contained all the information — especially that related to the mode or modes of transport — perceived as being necessary for carrying out the study.

3.2 Linking External Trade's Data File to Original Customs Documents

Although it was essential to obtain from the original B-13 or Customs Invoice forms information on the modes of transport employed, countries through which Canadian exports and imports transited, and whether or not a shipment was containerized, it was from the External Trade computer transactions file that the sample of trade transactions was selected and the print-out of these selected records (transactions) obtained. Furthermore, much of the information (the value of the transaction, country of origin, country of destination, etc.) to be used in combination with the modal information in the production of the final estimates was already present on this computer file. The task remaining consisted of linking the lines of data on the print-out of sample transactions to their respective original Customs documents to obtain the required additional information. This was accomplished by utilizing the information pertaining to number and location of the envelope, in which the original transaction document was stored, from the computer print-out of the sampled transactions. The original transaction document was then retrieved from storage, and the required additional information was extracted and manually transferred to the line of data for that transaction appearing on the print-out. This added information was then keyed in on the special tape created from the master tape of the sampled transactions producing a new data file. To this new data file were added the weights (expansion factors)** for all sampled transactions which, in combination with the required data already on file, were used in the production of the final estimates for 1979.

3.3 Sampling Scheme***

Owing to the enormous number of Customs documents received by the External Trade Division over a year and the budget constraints upon the study team, an attempt was made to estimate the proportion of multimodal transport movements in Canadian international trade by sampling the total population of trade transactions in the selected calendar year. (The year 1979 was chosen as the reference year since it was the most recent year for which complete data was available.) A systematic probability sample of some 3 248 export and import trade transactions in 1979 was selected on the basis of available funds and considerations related to minimum acceptable precision levels associated with the estimates to be generated.

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* Examples of the B-13, B-3 and the Customs Invoice are found in Appendix C.

** The weighting factors referred to are the inverse of the probability of selecting the transaction (sampling interval) in the sample.

*** Based on the unpublished report [3].

3.4 Target Population

As was previously indicated, trade transactions involving bulk commodities were not included in the sample. Other transactions which were eliminated from consideration were: Re-exports, Special Transactions trade (for both exports and imports), electricity and transactions valued under 1 000 dollars.*

Canadian transborder exports and imports of automobiles and their parts were also excluded from the sample of transactions selected from External Trade's data file because of the manner** in which they are reported to Statistics Canada and because of their overall dominance in terms of both number and value of export and import transactions. However, commodities comprising this group were considered to be such a significant part of Canadian transborder export and import trade that attempts were made to obtain information on the movements of these commodities directly from a number of the major firms involved in the production of these commodities and to include these findings in a separate section of the report (See Chapter 7). It was the view that this approach would lead to more reliable estimates of all other commodities as well as greater efficiencies in the utilization of available monetary resources.

3.5 Sample Design [3]

3.5.1 Stratification

Stratification can be viewed as a tool with the potential for increasing efficiency per unit cost in estimating certain characteristics of a given population. With reference to this study, it was perceived that the incidence of the use of multimodal transport in Canadian international trade could conceivably vary from month to month (seasonally), for imports and exports, in transborder and overseas trade, by major commodity group as well as by transaction value. Since, in most practical applications, stratification generally improves design efficiency and, since there was

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* Although External Trade receives documents for all transborder trade transactions under 1 000 dollars, it records and stores the information on computer file for only a 10 percent sample of the transactions. To have included this large volume of transactions in the sample would have led to reduced efficiencies in the use of available funds for the project. However, all transactions over 1 000 dollars are captured and stored.

** Because of the vast number of shipments involved, Statistics Canada normally permits major automobile manufacturers in Canada (among others) to submit required information on transborder exports and imports of automobiles and their parts via "summary reports" (in many cases, they are nothing more than a copy of the company's computerized records of monthly shipments of those commodities) rather than having them complete B-13s for each individual shipment. The sampling of transactions in a summary report would have presented problems, as modes of transport were usually lacking especially in those "summary reports" pertaining to transborder automobile exports and imports.

some question as to the variability of multimodal transport use in terms of the above, a decision was made to stratify the population of trade transactions in 1979 in an effort to capture the variation of this characteristic and to possibly improve the estimates. In other words, attempts were made to assure homogeneity within a stratum (in terms of the characteristic(s) estimated) and heterogeneity among the strata. As an initial step, all transactions in 1979 were grouped into twelve months with each month being considered a primary sampling unit (PSU). Of the twelve PSU's (months), the following three were selected in a systematic probabilistic manner:

a) January,
b) July,
c) November.

Within each of the selected months, trade transactions were then stratified on the basis of the following criteria:

i) Export or Import (2);
ii) Transborder Trade or Overseas Trade (2);
iii) Five Major Commodity Groups (5);
iv) Value of the Transaction* (3).

Within the sixty strata created, a systematic probability sample of 3 248 transactions was selected and the sampled transactions were allocated in proportion** to the total number of transactions in each of the above groups.

3.5.2 Estimating the Incidence of Multimodal Transport in Canadian International Trade [3]

The principle behind the estimation procedure employed in a probability sample is that each unit (transaction) in the sample "represents" many other units not in the sample. This implies that the sampled transactions must be expanded through the use of some weighting factor if population estimates are to be generated. Specifically, the weighting factor for a transaction, as well as all characteristics associated with that transaction, is given as the product of the inverse of the sampling ratio of the stratum in which the transaction falls and the

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* Each transaction was assigned to one of the following groups according to its value: 1 000 dollars - 3 000 dollars, 3 001 dollars - 30 000 dollars and 30 000 + dollars.

** Although the allocation of sampled transactions was proportional for the most part, in a few instances, because a stratum consisted of only a small number of transactions and because the proportional allocation would not guarantee a minimum number of transactions to be sampled from this stratum so as to produce a reasonably reliable estimate, a minimum number of transactions was sampled rather than the lower number which the consistent application of the proportional allocation scheme would have dictated. For details concerning the allocation of sampled transactions among the strata, see Appendix D.

factor four to account for the fact that only three months out of twelve in the calendar year were selected in the sample. The population estimates are then obtained for any characteristic (e.g. value of transaction) by multiplying the value of each transaction in the sample by the weighting factor and summing over all transactions.

Where estimates were required by number of transactions (shipments), the weighting factors, for all sampled transactions exhibiting the "multimodal" characteristic were simply summed over all strata for the three selected months. More detailed estimates of the use of multimodal transport could be produced, of course, by commodity group, country of origin, country of destination and modal combinations in terms of the number and value of shipments by performing the above operations and summing over only the appropriate strata for the selected months.

The above verbal explanation of the estimation procedure can be expressed in the following notation:

Let N_{ij} = total number of trade transactions in month i and stratum j

Where i = 1 for January, 2 for July and 3 for November

and j = 1 ... 60 (number of strata)

n_{ij} = number of sampled transactions from N_{ij}

x_{ij} = number of transactions from n_{ij} with characteristic "x". For example, this could be the number of transactions in which multimodal transport was employed

X = the population estimate of characteristic "x"

w_{ij} = initial weight* of X_{ij}, which is given by $4 \frac{N_{ij}}{n_{ij}}$

An estimate of the number of shipments** being transported multimodally in Canadian international trade is, therefore, obtained by employing the following formula:

$$\hat{X} = \sum_{j=1}^{60} \sum_{i=1}^{3} x_{ij} w_{ij}$$

Following this, an estimate of the proportion of the number of shipments in total Canadian international trade moving multimodally is thus given by:

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* This weight is considered "initial" in the sense that an "adjustment" of it was required due to a diminution in the sample size explained in the following section of the report.

** In calculating an estimate of the <u>value</u> of Canadian international trade moving by more than one mode of transport, the addition of one term to the final formula is necessary:

$$\hat{VX} = \sum_{j=1}^{60} \sum_{i=1}^{3} vx_{ij} w_{ij}$$

where v is the transaction value.

$$\hat{\bar{x}} = \sum_{j=1}^{60} \sum_{i=1}^{3} x_{ij} w_{ij} \Big/ \sum_{j=1}^{60} \sum_{i=1}^{3} n_{ij} w_{ij}$$

3.5.3 Adjustment of the Weighting Factor

Of the 3 248 trade transactions sampled and processed, a small number was found to be deficient in terms of the data necessary for generating final estimates. These, of course, were eliminated and the weighting factors of the "effective" sample of transactions adjusted by a factor given by the ratio of the number of selected transactions to the number of selected transactions for which information was available. The new adjusted weight was denoted by w_{ij}^*. The adjusted estimate of X_{ij} was then calculated in the following manner:

$$\hat{\bar{x}} = \sum_{j=1}^{60} \sum_{i=1}^{3} x_{ij} w_{ij}^*$$

3.5.4 Elimination of Abnormal Transactions from the Sample

Upon analyzing the initial estimates produced for the report, it was discovered that some estimates, particularly those of the proportion, by value, of exports being moved multimodally by commodity group and by country bloc, in overseas trade, when compared to base figures published in External Trade's Merchandise Trade: Exports 1979, were greatly distorted. Further checks isolated the problem of the gross over-estimates as being one of the inclusion of some abnormally large value transactions* for specific commodities in the effective sample.

After considering alternative solutions** to the problem of "outliers" in the sample of trade transactions, it was decided to eliminate from the estimates, all sampled transactions of those commodities for which the value of only some of these transactions was found to be extreme. The basis for excluding these commodities from the sampling exercise was that a majority of the half-dozen commodities affected were traded rarely or

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* It is not uncommon to select samples having a few observations which are relatively extreme with respect to the bulk of observations sampled; however this fact should not be considered as an adverse reflection on the sampling methodology employed.[8]

** "Outliers" are normally treated in one of two ways: By means of a procedure known as "trimming", where equal numbers of the lowest and highest observations are removed from the sample or by "winsorization" where the high and low extremes are replaced respectively by the next to highest and next to lowest extremes [8, p. 51]. Because of the small number of transactions sampled of the affected commodities, all these transactions were eliminated from the sample and no estimates of the affected commodities were produced. The commodity transactions identified as "outliers" and eliminated from the sample were: 96161, 04443, 00999, 00630, 00185, 33140 and 50739 (See Appendices A and B for precise commodity titles).

traded on an irregular basis in 1979 and thus could not be estimated with any degree of precision and hence reliability. Their inclusion would have only led to grossly distorted estimates at a more general level and an unjustified questioning of the sampling methodology employed.

3.6 Reasonableness and Reliability of the Estimates

Before any importance could be attached to the findings of this study, the statistics generated had to be examined first from the point of view of their reasonableness; that is, the general* overall estimates had first to be corroborated with existing data to determine if the figures produced were realistic. Since estimates of the value of exports and imports (by commodity group and country bloc) in Canadian international trade were generated, these could be compared to the "true" figures for 1979 contained in External Trade's Merchandise Trade publications. The estimates generated by way of the methodology described in detail above should exhibit "values" well below** those noted in the External Trade publications.

Total number of transactions, a statistic also generated in the study, could not be checked for reasonableness as no known "true" measures exist for this variable; however, it was assumed that if "value" figures were found to be realistic then "number of transactions" figures would be as well. Ideally, it would also be worthwhile examining estimates of the proportion of multimodal transport used in Canadian trade; however, it was because of a lack of statistics of this type that this study was undertaken.

Having evaluated the reasonable nature of the general estimates, some degree of reliability must now be attributed to the actual statistics produced:

> ... A relative measure of precision which is frequently used in sample surveys relates the standard error of an estimate to the size of the estimate. This measure, referred to as the coefficient of variation is very useful

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* Obviously estimates pertaining to the extent of use of multimodal transport in Canadian international trade could not be checked for authenticity since the basic premise is that no known figures of this nature exist and the major objective of this work is to produce such figures. Instead, the degree of reasonableness attributed to multimodal estimates generated here must depend to a great extent on one's faith in the operational procedures employed in the study and the consistency with which they were applied. What is referred to above is a check on general estimates of total trade, by commodity group and country bloc, among others, as this will give one an indication of whether or not the estimates of the general magnitude of trade upon which the more specific estimates are based is reasonable.

** It should be remembered that only break-bulk and containerized transactions were sampled while "bulk" transactions were eliminated; consequently, the estimates produced for exports and imports should never exceed the values in External Trade publications which reflect total trade in all commodities.

> for comparing the precision of different sample estimates when the sizes of sample estimates differ from one another... [4, p. 20]

Accordingly, the coefficient of variation (C.V.) has been employed as an indicator of the reliability of the study estimates. In this respect C.V.'s are displayed, as a percent, on all tables alongside those estimates to which they apply. Relatively speaking, a low C.V. indicates a reliable estimate while a high C.V. denotes an unreliable estimate.* Returning to the notation previously used in the description of the estimation procedure, the C.V. can be calculated in the following manner:

$$\hat{C.V.}\ (X_{ij}) = \sqrt{\frac{(N_{ij} - X_{ij})}{n_{ij}\ X_{ij}}}$$

Of course, because of the nature of the coefficient of variation, general estimates based on larger samples tend to be more reliable than more specific and detailed estimates which are normally based on smaller samples.

Since estimates produced are likely to be slightly higher or lower than the "true" figure, estimates in this study were also presented in terms of their confidence intervals:** "... A confidence interval constitutes a statement on the level of confidence that the "true" value for the population lies within a specified range of values..." [4, p. 20-21]

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* For purposes of this study, the estimates produced were subjectively classified, according to their respective coefficients of variation, as follows:

Range of C.V.	Level of Reliability
0 - 5%	very reliable
6 - 10%	reliable
11 - 25%	somewhat reliable
26 - 33%	limited reliability
34%+	not reliable

It should be noted that Statistics Canada's policy relative to the publication of estimates produced in sample surveys is based on the level of the coefficient of variation for these estimates and is as follows:

Range of C.V.	Type of Estimate
0 - 16.5%	unqualified
16.6 - 25.0%	qualified
25.1 - 33.3%	restricted
33.4%+	not for release

** A 95 percent ($\pm$ 2 Standard Deviations) Confidence Interval was used in this study. This means that "... if sampling is repeated indefinitely, each sample leading to a new confidence interval, then in 95 percent of the samples the interval will cover the true population result..." [1, p. 8]

It should be emphasized that caution should be observed when evaluating the reasonableness of any statistic produced in the study and total confidence should not be placed in the coefficient of variation as an infallible indicator of the "true" reliability of the estimate. Instead, it is recommended that the relevance of the reliability indicators generated should be viewed in the context of the following sections which describe operational problems encountered in the study and the attention of the reader focussed on caveats associated with the multimodal transport estimates.

Chapter 4

OPERATIONAL PROBLEMS AND CAVEATS ASSOCIATED WITH STUDY FINDINGS

Emphasis, in this study, has been concentrated on selecting an appropriate data base, developing a sampling methodology and combining the two to provide some indication of the relative use of multimodal transport in Canadian international trade. However, the results presented here are not without their limitations and, it is the purpose of this section to make the reader aware of operational difficulties encountered in the study so he may better judge to what extent and in what context the results may be used. Operational problems encountered will be discussed briefly in general terms and then in the context of both transborder and overseas estimates generated in the study.

4.1 The Concept of Multimodal Transport

To begin, an effort was made to employ a definition of "multimodal transport" paralleling, as closely as possible, that stipulated in the MT Convention. International multimodal transport has been defined, in Article 1 of the Convention, as:

> ... a means of carriage of goods by at least two different modes of transport on the basis of a multimodal transport contract from a place in one country at which the goods are taken in charge by the MTO to a place designated for delivery situated in a different country ....[7, p. 3]

In the context of this study, there was no possibility of defining MT movements on the basis of the contract of carriage (MT document) as it is not currently employed in international trade and since the data base used consisted of Customs documents rather than through bills of lading*. There is also the larger problem that although Customs documents are evidence of the international movement of goods, they normally do not indicate whether the movement was a continuous one; that is, whether or not goods were stored at the port of exit or port of entry for an extended period of time before they were shipped out or moved on to a "final" destination. This knowledge is essential in determining whether movements should be considered as one international multimodal movement or one international unimodal movement combined with one or more domestic unimodal movements. Since Customs

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* Through bills of lading are regarded as closely approximating the proposed MT document both in form and purpose; however, even these could not be used as a source of data for the study as, normally, commodity values do not appear on contracts of carriage.

documents do not normally indicate transactions as having moved on a "through" basis,* a transaction was viewed as being a multimodal or unimodal movement on the basis of the number of different physical modes indicated on the relevant document.

4.2 The Concept of Pick-up and Delivery

Another concept which presented difficulties in defining movements as either multimodal or unimodal was that of pick-up and delivery services. Article 1 of the Convention states:

> ... operations of pick-up and delivery of goods carried out in the performance of a unimodal transport contract, as defined in such a contract should not be considered as international multimodal transport .... [7, p. 3]

The fact that pick-up and delivery services as part of the main contract of carriage are not counted as additional modes of transport when determining the number of modes involved in a movement further complicates matters as Customs documents do not distinguish** between pick-up and delivery service and an independent mode particularly in the case of intracity movements at either end of the international leg. Thus, for purposes of the study, if a Customs document indicated that an additional mode was used in the movement of goods from the wharf or airport to a final destination within a city (i.e. Montréal, Vancouver, etc.) this mode was not considered as an

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* The "through" movement concept appears to be implied in the use of international multimodal transport.

** On both B-13s and Customs Invoices there is a space for designating local Canadian carriers involved in the movement of goods to the port of exit or final destination from the port of entry. However, there is no easy way of determining whether the consignee or his agent contracted, on his own account, an independent carrier to transport the goods from his warehouse to the wharf or vice versa (in which case the mode should be viewed as being involved in a domestic movement rather than as part of the international movement), or whether the carrier responsible for the international leg of the movement subcontracted another modal carrier to provide pick-up and delivery service which the international carrier would normally provide or whether the carrier responsible for the international leg undertook to pick up the goods (in the case of exports) or deliver them (in the case of imports) as part of his contract of carriage. Reliable sources have indicated that sea carriers, as international transporters, do indeed provide, under the terms of their contract, pick-up and delivery services from time to time when requested by clients. Therefore, depending upon how an actual movement is interpreted, the above example could be viewed as: using an additional mode of transport, using pick-up and delivery services or as a combination of domestic and international movements. To simplify matters for purposes of producing estimates, the approach described in the text was used.

additional mode in the determination of the number of modes involved in the international movement. In contrast, when goods were moved to major ports of exit or from ports of entry or from or to inland points not considered part of the metropolitan areas of these ports, the modes involved were considered as additional modes in the movement. To some extent, international multimodal transport may have been underestimated as, in operational terms, intra port-city ultimate or penultimate transport legs for export and import movements were treated as "incidental" or domestic transport and not as an additional mode in the international movement.

4.3 Other Operational Problems Encountered and Solutions Adopted

Another problem given some consideration in this study was that of consolidation of commodities for transport overseas or to the U.S. and the distribution* of goods from one central point to final destinations. Fortunately, these movements could be assumed to be primarily domestic movements and therefore beyond the purview of this study.

Occasionally, in the determination of the number of transport modes used in an international movement, it was evident from information on the Customs documents (i.e. pertaining to "original" origin and "final" destination) that an additional mode had been employed in the movement but not recorded** on the form. If this mode could not be determined from the available information, then it was treated as an "unknown" mode and coded as such. In delimiting between unimodal and multimodal transactions, this posed no great operational problem; but, when producing estimates of modal combinations used in export and import movements, estimates of combinations of modes involving an unknown mode also had to be produced. This fact has thus led to an underestimate of the proportions of most modal combinations used in Canadian export and import trade as it is assumed that, if the "unknown" mode was "known" in all cases where it was labelled as the former, then this would somewhat augment those estimates pertaining to the various modal combinations observed.

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* For example, an international movement from London, England, to Montréal where the shipment was then subdivided and immediately moved as a number of independent consignments to different final destinations. The Customs document would only contain information related to the international transaction showing Montréal as a final destination. The fact that the shipment was deconsolidated and distributed from Montréal is of no consequence to this study (indeed a good case could be made for interpreting these final movements as domestic movements rather than part of the international movement). This problem was handled in the same manner for both exports and imports.

** As one might expect, on the whole, import forms (Customs Invoices) appeared to be more detailed and complete than their export counterpart (B-13s) as Customs Invoices along with the B-3 declaration are primarily used in assessing duty on goods.

As a final note, it should be pointed out that in order to limit the number of "unknowns", great pains were taken to utilize all information given in the Customs documents in an attempt to reconstruct international movements of goods and determine the modes involved in their transport.

4.4 Problems Associated with Estimates of Multimodal Transport in Export Trade

When goods moved between major Canadian port-cities and overseas markets, in some cases, the local Canadian carrier could not be identified nor the movement classified (i.e. pick-up and delivery or an additional mode). At the other end of the same movements, export shipments were frequently consigned to major cities in importing countries and if another true final destination* existed for the goods, it could not be discerned** from information on the B-13 form. Occasionally, information on the B-13 pertaining to the address of the consignee was used to determine the final destination and whether or not additional modes could have been employed in the movement. However, care was taken not to use the address of a freight forwarder,*** where he was indicated as the importer or consignee, when determining the final destination of the goods. Instead, attempts were made to determine the actual buyer of the goods from the information on the B-13 and this would be used to pinpoint the final destination.

Differentiating between unimodal and multimodal movements proved to be much more difficult for overseas exports than for transborder exports because routing patterns for transborder movements were much less complex than those for overseas movements.

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* In the case of both B-13 and Customs Invoice forms, emphasis is placed on identifying the country of origin or the country of destination of the goods with less care taken in noting actual origin or destination of the goods. This makes the problem of determining the "original" origin or "final" destination and the number of modes involved in the movement somewhat more difficult.

** It is quite possible that, in the majority of these cases, exports were consumed in the city of consignment or would be distributed to many other centres from this point, in which case, these commodities were considered as moving unimodally or multimodally only on the basis of the modes used in the movement from the local point of lading in Canada to the importing country. Of course, it could be argued that even though prior arrangements had been made by the importer to move the goods with almost no delay (thus constituting a through movement in theory) from the point of entry to the final destination, for purposes of this study only the movement covered by the Customs document was considered in determining whether or not it constituted an international multimodal movement.

*** Normally the forwarder's address noted on the B-13 bore no relation to the "original" origin or "final" destination of the goods and information pertaining to the local point of lading (if present) and the address of the actual purchaser of the goods was used in lieu of the forwarder information to determine true origin and destination.

In the event that two different modes of transport were employed in the Canadian portion of an export movement alone, the transaction was then coded as a multimodal movement regardless of whatever other modes were used in the movement of these same goods from the port of entry to the final destination in the importing country, although attempts were still made to determine if other modes had been used in the importing country.

Finally, with specific reference to transborder exports, identification of movements as multimodal or unimodal was quite easy, as most of the time all necessary information was present on the form; however, one anomaly related to these movements did come to light in the collection stage of the study. In a good number of sampled transactions, it was found that two different carriers representing the same mode were used to move the goods, the transfer taking place, in many cases, at the border crossing or major city nearest the border. This appears to be a function of regulatory constraints in the U.S. and Canada as well as carrier agreements on the transferring of cargo at border points. These movements were always treated as unimodal in the study.

4.5 Problems Associated with Estimates of Import Trade

With reference to overseas imports, the major mode used in the movement of the goods was always noted in the Customs Invoice. Furthermore, by noting the address of the importer, consignee and purchaser of the goods, as well as that of the consignor, the origin and final destination of the goods could usually be discerned and other modes (if any) used in the movement identified. Occasionally the local carrier to final destination (along with the carrier from the origin to the port of exit in the exporting country) was not indicated but by making use of all information on the form, it could at least be determined if another mode had been employed even if it had to be labelled as "unknown". Of course, attempts were also made to determine whether another mode (other than the main mode) was used in the movement of goods from origin to port of exit in the exporting country by utilizing the "vendor's" address. However, if the goods originated in a port-city in the country of origin, there was no way of telling from the Customs Invoice if another mode was used to move the goods being exported to the wharf or airport since the local carriers in the exporting country are not normally identified on Canadian Customs documents.

As with transborder exports, transborder imports were more easily identifiable as unimodal or multimodal movements and the anomaly of two separate carriers of the same mode involved in the transport also appeared.

4.6 General Limitations Associated with Estimates

In light of the preceding explanation of the operational problems encountered and the methods of approach taken to rectify these problems, it would appear that, generally speaking, there may have been a tendency to underrepresent the proportion of multimodal transport employed in Canadian overseas export and import trade in 1979. For the most part, this can be

attributed to an inability to distinguish between pick-up and delivery services and additional modes used in the transport of goods given the data base of the study. To what extent multimodal transport proportions have been underestimated cannot be determined without considerably more effort to compare and/or combine different data sources. However, this study presents an indication of the general scale of the use of multimodal transport in movements which could conceivably be covered under an MT Convention without any reservations. However, it is quite possible that, if such a convention were to enter into force, it could change the proportions presented here considerably, with a large portion of trade which now moves unimodally (according to the findings) moving under the MT Convention in the future. There is even a possibility that shippers presently moving their goods multimodally, but in a segmented manner (as identified in the study) may wish to continue to move them in such a way rather than have them governed by rules and regulations stipulated in an MT Convention.

It should be emphasized that the above mentioned operational anomalies should be taken into consideration in the context of any analysis of the estimates presented hereafter.

Chapter 5

AN EVALUATION OF THE REASONABLENESS OF THE ESTIMATES

5.1 Reasonableness of the Estimates Generated

Before detailed findings could be presented, the estimates generated via the methodology employed were first examined to see if, in fact, they appeared reasonable when compared to figures in External Trade's Merchandise Trade publications for 1979. Since estimates of the value* of export and import trade were produced for transborder and overseas trade separately as well as by commodity group, country of origin and country of destination, they were checked using the corresponding figures in the Statistics Canada publications.

5.1.1 Total Exports and Imports for 1979

An examination of the estimates of total value of exports and imports for 1979 confirmed that figures produced in this study are much lower than the "true" figures contained in the Merchandise Trade publications. Whereas External Trade's publications showed the total value of Canadian exports and imports in 1979 to be 65.5 billion dollars [5, p.20] and 62.7 billion dollars [6, p.7] respectively, the comparable estimates generated in this study for export and import trade were 34.9 billion dollars and 36.1 billion dollars. The differences reflect the fact that the number of commodities considered in the sample was much less than the total number of commodities included in total Canadian import and export trade.

5.1.2 Transborder and Overseas Exports and Imports

Since, for purposes of the study, estimates of Canadian export and import trade were produced separately for transborder (Canada-U.S.) and overseas trade, these were examined as well in the context of corresponding figures contained in Statistics Canada publications.

According to External Trade's definitive figures for 1979, transborder exports totalled 44.4 billion dollars** while overseas exports totalled 21.1 billion dollars [5]. Study estimates generated for the

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* It should be reiterated that estimates of the number of shipments as well as value were produced; however, as was stated earlier, the reasonableness of the former figures could not be confirmed because of the lack of data from another source to act as a check.

** All figures in this section have been rounded to the nearest hundred thousand dollars.

comparable trades were 21.6 billion dollars and 13.3 billion dollars, again much lower than the "true" figures and thus considered to be reasonable. Transborder and overseas import estimates (25.1 billion $ and 10.9 billion $ respectively) were found to be similar to their export counterparts in that they, too, were much lower than the supposed "true" figures (45.4 billion $ and 17.3 billion $). [6]

5.1.3 Import and Export Value Estimates by Commodity Group

As can be readily seen from Table 1, value estimates produced in the study, by commodity group, on both the export and import side are consistently lower than the comparable figures contained in the Merchandise Trade publications.

The relationship of study-derived figures to those of External Trade leads one to consider the estimates by commodity group reasonable.

5.1.4 Estimates of the Value of Import and Export Trade by Countries of Origin and Destination

In order to verify the reasonableness of the value estimates generated at the level of country blocs, figures for only a few of the total number of country blocs represented in the data are examined here.

Again, as one can see from Table 2, all estimates generated in the study are below those appearing in the Statistics Canada publications thus giving credence to the estimates' reasonableness. Although all country bloc estimates generated have not been presented here, they have, nevertheless, been examined and all were found to be well below those figures appearing in the data sources used as checks.

From the preceding analyses, it would appear that all general estimates produced in the study satisfy the criterion established for evaluating their reasonableness. Therefore, the report proceeds with the presentation of the specific findings related to the use of multimodal transport in Canadian international trade.

Table 1

COMPARISON OF GENERATED VALUE ESTIMATES AND EXTERNAL TRADE VALUE FIGURES BY COMMODITY GROUP

Commodity Group	Exports		Imports	
	estimate	ext. trade*	estimate	ext. trade**
	(millions $)		(millions $)	
live animals	207	245	65	75
food, feed, beverages and tobacco	4 473	6 048	3 511	4 160
crude materials, inedible	2 650	12 532	1 460	7 930
fabricated materials, inedible	19 970	24 372	9 997	12 062
end products, inedible	7 596	20 825	21 042	37 928

* Statistics Canada, Exports: Merchandise Trade: 1979.
** Statistics Canada, Imports: Merchandise Trade: 1979.

Table 2

COMPARISON OF GENERATED VALUE ESTIMATES AND EXTERNAL TRADE VALUE FIGURES BY SELECTED COUNTRY BLOCS

Country Bloc	Exports		Imports	
	estimate	ext. trade*	estimate	ext. trade**
	(millions $)		(millions $)	
Europe	7 116	8 438	5 465	6 805
Asia	3 425	6 167	4 228	4 285
Soviet Bloc	100	1 214	308	326
South America	667	1 711	198	2 226

* Statistics Canada, Exports: Merchandise Trade: 1979, p. 2-4.
** Statistics Canada, Imports: Merchandise Trade: 1979, p. 2-7.

Chapter 6

MULTIMODAL TRANSPORT IN THE CONTEXT OF CANADIAN INTERNATIONAL TRADE: FINDINGS AND OBSERVATIONS

6.1 Use of Multimodal Transport in Canadian Export Trade

6.1.1 Transborder Trade

As can be seen in Table 3, of a total study-related value of containerized and break-bulk goods in transborder trade of some 22 billion dollars in 1979, only 4 percent (0.8 billion $)* was estimated to be moving multimodally while an overwhelming 96 percent (20.8 billion $) continued to move unimodally. An examination of the coefficients of variation of these estimates (2% for unimodal transport and 12% for multimodal transport) indicates that both are reliable estimates, although the unimodal transport estimate appears to be more reliable than the one produced for multimodal transport.

Estimates of the proportion of the number of shipments (transactions) moving multimodally were also generated and are presented in Table 4. The figures revealed that, as was the case for value, only 4 percent (39 000) of the total number of shipments in 1979 transborder trade moved multimodally but the remaining 96 percent (1 022 000) was transported unimodally. According to their coefficients of variation, these estimates proved to be very reliable (1%), in the case of the unimodal figure, and somewhat reliable (19%) in the case of the multimodal figure.

6.1.2 Overseas Trade

Compared to transborder trade, the proportion of goods exported overseas moving multimodally was much more significant but still accounted for less than half of the total value and number of shipments of containerized and break-bulk goods moving in overseas trade in 1979.

Of a total of 264 000 shipments (transactions) in overseas export trade in 1979, 43 percent (114 000) was found to be moving multimodally. Both this estimate and the one for unimodal movements were viewed as very reliable according to their respective coefficients of variation (4% for the former and 2% for the latter).

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* All dollar values, numbers of shipments and coefficients of variation presented in this section have been rounded to the nearest million dollars, thousand shipments and whole percent respectively.

Table 3

ESTIMATE OF THE PROPORTION OF MULTIMODAL AND UNIMODAL MOVEMENTS
IN CANADIAN TRANSBORDER AND OVERSEAS EXPORT TRADE IN 1979
By Value

Type of Trade	Multimodal Movements					Unimodal Movements					Totals				
	estimate (mil. $)	confidence intervals (95% level) min. (mil. $)	confidence intervals (95% level) max. (mil. $)	C.V. (%)	%	estimate (mil. $)	confidence intervals (95% level) min. (mil. $)	confidence intervals (95% level) max. (mil. $)	C.V. (%)	%	estimate (mil. $)	confidence intervals (95% level) min. (mil $)	confidence intervals (95% level) max. (mil $)	C.V. (%)	%
transborder	802	610	994	12	3.7 (15.4)	20 838	20 004	21 672	2	96.3 (70.2)	21 640	20 774	22 506	2	100 (62.0)
overseas	4 405	4 229	4 581	2	33.2 (84.6)	8 851	8 674	9 028	1	66.8 (29.8)	12 256	12 991	13 521	1	100 (38.0)
total	5 207	-	-	-	14.9 (100)	29 689	-	-	-	85.1 (100)	34 896	-	-	-	100 (100)

Notes:

1. Coefficients of variation (approximations), estimates and confidence intervals have been rounded off.
2. Percentages in brackets apply to column totals.

Table 4

ESTIMATE OF THE PROPORTION OF MULTIMODAL AND UNIMODAL MOVEMENTS
IN CANADIAN TRANSBORDER AND OVERSEAS EXPORT TRADE IN 1979
By Number of Shipments

Type of Trade	Multimodal Movements					Unimodal Movements					Totals				
	estimate ('000)	confidence intervals (95% level) min. ('000)	confidence intervals (95% level) max. ('000)	C.V. (%)	%	estimate ('000)	confidence intervals (95% level) min. ('000)	confidence intervals (95% level) max. ('000)	C.V. (%)	%	estimate ('000)	confidence intervals (95% level) min. ('000)	confidence intervals (95% level) max. ('000)	C.V. (%)	%
transborder	39	24	54	19	3.7 (25.5)	1 022	1 002	1 042	1	96.3 (87.2)	1 061	1 040	1 082	1	100 (80.1)
overseas	114	105	123	4	43.2 (74.5)	150	144	156	2	56.8 (12.8)	264	264	264	0	100 (19.9)
total	153	-	-	-	11.5 (100)	1 172	-	-	-	88.5 (100)	1 325	-	-	-	100 (100)

Notes:

1. Coefficients of variation (approximations), estimates and confidence intervals have been rounded off.
2. Percentages in brackets apply to column totals.

In terms of the value of trade, some 4.4 billion dollars (33%) of a total of 13.3 billion dollars moved multimodally; the remaining 8.9 billion dollars (67%) was estimated to be transported unimodally. Again, coefficients of variation (2% and 1% respectively) revealed the estimates to be very reliable.

When transborder and overseas export trade were combined, goods transported via a combination of modes accounted for only 15 percent (5.2 billion $) of the total value (34.9 billion $) and 12 percent (153 000) of the total number of shipments (1 325 000) in 1979. Transport by one mode, according to the estimates, continued to dominate Canadian export trade by a wide margin in 1979.

6.2 Use of Multimodal Transport in Canadian Import Trade

6.2.1 Transborder Trade

As in the case of transborder exports, the use of one mode of transport to move goods from the U.S. to Canada in 1979 totally dominated the trade in terms of both measures used. Estimates revealed that 93 percent (23.4 billion $) of a total value of 25.1 billion dollars and 95 percent (i.e. 2 061 000) of the total number of shipments (2 167 000) were transported unimodally, but only 5 percent (106 000) of the total number of shipments with a corresponding value of 1 707 million dollars (7% of total value) was transported multimodally. With the exception of the estimate for the number of shipments moving multimodally, whose coefficient of variation indicated the estimate to be only somewhat reliable, all of the other above estimates' C.V.'s indicated these to be very reliable.

6.2.2 Overseas Trade

Unimodal movements of goods also dominated Canadian overseas import trade both by value and number of shipments, although the difference was not as pronounced as in transborder import trade. Movements by a single mode accounted for 57 percent (6.2 billion $) by value and 62 percent (419 000) by number of shipments of all overseas import movements in 1979. The comparable figures for the use of multimodal transport were 43 percent and 39 percent respectively. A perusal of the C.V.'s generated (see Tables 5 and 6) indicated all estimates in this category to be very reliable without exception.

Finally, when transborder and overseas import trade were combined, single mode movements still dominated total trade by a considerable margin accounting for 82 percent (29.6 billion $) by value and 87 percent (2 480 000) of the total number of shipments. Movements employing modal combinations accounted for only 18 percent of the total value and 13 percent of the total number of shipments in combined import trade.

Table 5

ESTIMATE OF THE PROPORTION OF MULTIMODAL AND UNIMODAL MOVEMENTS
IN CANADIAN TRANSBORDER AND OVERSEAS IMPORT TRADE IN 1979
By Value

Type of Trade	Multimodal Movements					Unimodal Movements					Totals				
	estimate (mil. $)	confidence intervals (95% level) min. (mil. $)	confidence intervals (95% level) max. (mil. $)	C.V. (%)	%	estimate (mil. $)	confidence intervals (95% level) min. (mil. $)	confidence intervals (95% level) max. (mil. $)	C.V. (%)	%	estimate (mil. $)	confidence intervals (95% level) min. (mil. $)	confidence intervals (95% level) max. (mil. $)	C.V. (%)	%
transborder	1 707	1 502	1 912	6	6.8 (26.5)	23 424	22 487	24 361	2	93.2 (79.1)	25 131	24 126	26 136	2	100 (69.7)
overseas	4 739	4 549	4 929	2	43.3 (73.5)	6 205	5 957	6 453	2	56.7 (20.9)	10 944	10 506	11 382	2	100 (30.3)
total	6 446	-	-	-	17.9 (100)	29 629	-	-	-	82.1 (100)	36 075	-	-	-	100 (100)

Notes:

1. Coefficients of variation (approximations), estimates and confidence intervals have been rounded off.
2. Percentages in brackets apply to column totals.

Table 6

ESTIMATE OF THE PROPORTION OF MULTIMODAL AND UNIMODAL MOVEMENTS
IN CANADIAN TRANSBORDER AND OVERSEAS IMPORT TRADE IN 1979
By Number of Shipments

Type of Trade	Multimodal Movements					Unimodal Movements					Totals				
	estimate ('000)	confidence intervals (95% level) min. ('000)	max.	C.V. (%)	%	estimate ('000)	confidence intervals (95% level) min. ('000)	max.	C.V. (%)	%	estimate ('000)	confidence intervals (95% level) min. ('000)	max.	C.V. (%)	%
transborder	106	72	140	16	4.9 (28.8)	2 061	2 020	2 102	1	95.1 (83.1)	2 167	2 124	2 210	1	100 (76.1)
overseas	262	241	283	4	38.5 (71.2)	419	394	444	3	61.5 (16.9)	681	681	681	0	100 (23.9)
total	368	-	-	-	12.9 (100)	2 480	-	-	-	87.1 (100)	2 848	-	-	-	100 (100)

Notes:

1. Coefficients of variation (approximations), estimates and confidence intervals have been rounded off.
2. Percentages in brackets apply to column totals.

6.3 Incidence of Multimodal Transport in Combined Canadian Export and Import Trade

When Canadian export and import trade are combined, the figures reveal that movements using various modal combinations accounted for less than a fifth (16%) of the total value of goods being moved in Canadian international trade in 1979. In terms of the number of shipments, the figure was even lower, with multimodal transport being used in just under 13 percent of total shipments. These figures appear to be much lower than in preceding sections due to the overwhelming dominance of unimodal transport in Canadian trade with the U.S. and its one-sided effect on total trade figures.

6.4 Portion of Export Trade Moving Multimodally by Commodity Groupings

6.4.1 Transborder Trade

With reference to Canadian transborder export trade in general, the use of multimodal transport in the movement of goods appears to be of little importance regardless of the commodity group considered (see Tables 7 and 8). In none of the five groupings does the use of multiple modes as a proportion of the total value or total number of shipments exceed 10 percent. Goods classified as Fabricated Materials accounted for almost 40 percent of the total value and number of shipments of all commodity groupings moving multimodally.

With the exception of value estimates generated for Fabricated Materials and End Products, all other estimates for the three remaining commodity groupings were found to be unreliable. In terms of the number of shipments estimates, the one generated for Fabricated Materials proved to be of limited reliability while all others were found to be unreliable.

6.4.2 Overseas Trade

In contrast to transborder trade, multimodal transport assumes substantially more importance in overseas trade. In some commodity groupings the manner in which goods move is split almost equally between movements by one mode and movements by more than one mode (see Tables 7 and 8). Indeed, with reference to the value of goods classified as Crude Materials, multimodal transport is used more than unimodal transport as the predominant means of conveyance. As well, the estimated number of shipments of goods classified as Food, Feed, Beverages and Tobacco and transported by multiple modes exceeds the number carried by a single mode.

Movements of goods classified as Food, Feed, Beverages and Tobacco; Fabricated Materials, and End Products accounted for close to three-quarters of the total value and nine-tenths of the number of shipments transported by various modal combinations for all five commodity groups combined.

With the exception of estimates produced for Live Animals, other estimates generated in overseas trade proved to be reliable to varying degrees (see Tables 7 and 8).

Table 7

ESTIMATES OF THE VALUE OF 1979 TRANSBORDER AND OVERSEAS EXPORT TRADE
MOVING MULTIMODALLY AND UNIMODALLY
By Commodity Group

Type of Trade/ Commodity Gp.	Multimodal Movements					Unimodal Movements					Totals				
	estimate (mil. $)	confidence intervals (95% level) min. (mil. $)	max.	C.V. (%)	%	estimate (mil. $)	confidence intervals (95% level) min. (mil. $)	max.	C.V. (%)	%	estimate (mil. $)	confidence intervals (95% level) min. (mil. $)	max.	C.V. (%)	%
Transborder															
live animals	-	-	-	-	- (-)	173	87	260	25	100.0 (0.8)	173	87	260	25	100.0 (0.8)
food, feed, beverages & tobacco	138	41	235	35	8.7 (17.2)	1 449	1 130	1 768	11	91.3 (7.0)	1 587	1 333	1 841	8	100.0 (7.4)
crude materials	64	5	123	46	9.2 (8.0)	635	457	813	14	90.8 (3.0)	699	517	881	13	100.0 (3.2)
fabricated materials	318	191	445	20	2.3 (39.6)	13 668	12 848	14 488	3	97.7 (65.6)	13 986	13 147	14 285	3	100.0 (64.6)
end products	282	169	395	20	5.4 (35.2)	4 913	4 422	5 404	5	95.6 (23.6)	5 195	4 676	5 715	5	100.0 (24.0)
total	802	610	994	12	3.7 (100.0)	20 838	20 004	21 672	2	96.3 (100.0)	21 640	20 774	22 506	2	100.0 (100.0)
Overseas															
live animals	9	4	14	30	26.5 (0.2)	25	17	33	16	73.5 (0.3)	34	23	45	16	100.0 (0.3)
food, feed, beverages & tobacco	725	782	769	3	25.1 (16.5)	2 161	2 075	2 247	2	74.8 (24.4)	2 886	2 771	3 001	2	100.0 (21.8)
crude materials	1 151	1 082	1 220	3	59.0 (26.1)	800	752	848	3	41.0 (9.0)	1 951	1 873	2 029	2	100.0 (14.7)
fabricated materials	1 422	1 337	1 507	3	23.8 (32.3)	4 562	4 380	4 744	2	76.2 (51.6)	5 984	5 864	6 104	1	100.0 (45.1)
end products	1 098	1 032	1 164	3	45.7 (24.9)	1 303	1 225	1 381	3	54.3 (14.7)	2 401	2 305	2 497	2	100.0 (18.1)
total	4 405	4 229	4 581	2	33.2 (100.0)	8 851	8 674	9 028	1	66.8 (100.0)	13 256	12 991	13 521	1	100.0 (100.0)

Notes:

1. Coefficients of variation (approximations), estimates and confidence intervals have been rounded off.
2. Percentages in brackets apply to column totals only.

Table 8

ESTIMATES OF THE NUMBER OF SHIPMENTS IN 1979 TRANSBORDER AND OVERSEAS EXPORT TRADE MOVING MULTIMODALLY AND UNIMODALLY
By Commodity Group

Type of Trade/ Commodity Gp.	Multimodal Movements					Unimodal Movements					Totals				
	estimate ('000)	confidence intervals (95% level) min. ('000)	max. ('000)	C.V. (%)	%	estimate ('000)	confidence intervals (95% level) min. ('000)	max. ('000)	C.V. (%)	%	estimate ('000)	confidence intervals (95% level) min. ('000)	max. ('000)	C.V. (%)	%
Transborder															
live animals	-	-	-	-	- (-)	10	2	18	39	100.0 (1.0)	10	2	18	39	100.0 (0.9)
food, feed, beverages & tobacco	7	0	14	47	7.9 (17.9)	82	61	103	13	92.1 (8.0)	89	66	112	13	100.0 (8.4)
crude materials	4	0	9	62	8.2 (10.3)	45	30	60	17	91.8 (4.4)	49	32	66	17	100.0 (4.6)
fabricated materials	15	7	23	27	2.3 (38.5)	629	591	667	3	97.7 (61.5)	644	605	683	3	100.0 (60.7)
end products	13	3	23	39	4.8 (33.3)	256	225	287	6	95.2 (25.1)	269	237	301	6	100.0 (25.4)
total	39	24	54	19	3.7 (100.0)	1 022	1 002	1 042	1	96.3 (100.0)	1 061	1 040	1 082	1	100.0 (100.0)
Overseas															
live animals	-	-	-	-	- (-)	1	0	2	53	100.0 (0.7)	1	0	2	53	100.0 (0.4)
food, feed, beverages & tobacco	27	22	32	9	56.3 (23.7)	21	16	26	11	43.7 (13.9)	48	41	55	7	100.0 (18.1)
crude materials	10	7	13	17	43.5 (8.8)	13	9	17	17	56.5 (8.6)	23	18	28	11	100.0 (8.7)
fabricated materials	38	32	44	8	46.9 (33.3)	43	36	50	8	53.1 (28.5)	81	73	89	5	100.0 (30.6)
end products	39	33	45	8	34.8 (34.2)	73	66	80	5	65.2 (48.3)	112	103	121	4	100.0 (42.2)
total	114	105	123	4	43.0 (100.0)	151	145	157	2	57.0 (100.0)	265	265	265	0	100.0 (100.0)

Notes:

1. Coefficients of variation (approximations), estimates and confidence intervals have been rounded off.
2. Percentages in brackets apply to column totals only.

6.5 Portion of Import Trade Moving Multimodally by Commodity Groupings

6.5.1 Transborder Trade

When transborder trade was further dissected to produce estimates for commodity groupings (see Tables 9 and 10), it was discovered that, in none of the five major commodity classifications, did movement by more than one mode of transport figure significantly, either in terms of value or number of shipments, in total trade attributed to the individual groups. In fact, in none of the five commodity groupings did multimodal transport account for more than 9.2 percent of the total value of all goods of that group moved from the U.S. to Canada in 1979 nor was this type of transport employed in more than 12.2 percent of the total number of shipments for any one group.

In relative terms, by value, multimodal transport was used more often (8%) to move those goods classified as End Products but, in terms of the number of shipments, those goods classified as Crude Materials were moved more often via modal combinations. In absolute terms, End Products, being the largest group in both value and number of shipments, were moved by modal combinations to the tune of 1 242 million dollars of a total of 15.1 billion dollars and in 78 000 of a total of 1 275 000 shipments, with estimates of the other four major groups well below these maximums.

An examination of C.V.'s generated for value estimates of the five commodity groups indicated that only one (Live Animals) of the five was unreliable;* the others ranged from limited reliability to reliable. Estimates of the number of shipments for four of the five groupings were also found to be unreliable with only the End Products group exhibiting a C.V. indicating some degree of reliability (i.e. 18%).

6.5.2 Overseas Trade

In the case of overseas import trade, the proportions, by both value and number of shipments, of goods moving multimodally were substantially higher than those seen on the transborder side. With the exception of Live Animals (which still showed an aversion to being transported by more than one mode), between 35 percent and 50 percent of goods, by value and number of shipments, in the other four commodity groups were found to be moving by more than one mode of transport. In absolute terms, greater values and numbers of shipments of End Products and Fabricated Materials, than those of other commodity groupings appeared to move multimodally. However, it should be emphasized that in none of the five groupings did that portion of those groups moving multimodally surpass that portion of trade of the same groups moving by one mode only.

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* The fact that these estimates were found to be unreliable is a function of the detailed nature of the estimates and is most likely due to the small sample size upon which the estimate was based; however, this does not mean that the findings are not useful. In fact, these estimates still give the reader an idea of the general magnitude of the incidence of multimodal transport within individual commodity groupings for comparative purposes.

Table 9

ESTIMATES OF THE VALUE OF 1979 TRANSBORDER AND OVERSEAS IMPORT TRADE MOVING MULTIMODALLY AND UNIMODALLY
By Commodity Group

Type of Trade/ Commodity Gp.	Multimodal Movements					Unimodal Movements					Totals				
	estimate (mil. $)	confidence intervals (95% level) min. (mil. $)	confidence intervals (95% level) max. (mil. $)	C.V. (%)	%	estimate (mil. $)	confidence intervals (95% level) min. (mil. $)	confidence intervals (95% level) max. (mil. $)	C.V. (%)	%	estimate (mil. $)	confidence intervals (95% level) min. (mil. $)	confidence intervals (95% level) max. (mil. $)	C.V. (%)	%
Transborder															
Live animals	4	0	14	126	6.3 (0.2)	59	21	97	32	93.7 (0.3)	63	23	103	32	100.0 (0.2)
Food, feed, beverages & tobacco	144	72	216	25	7.0 (8.4)	1 924	1 693	2 155	6	93.0 (8.2)	2 068	1 820	2 316	6	100.0 (8.2)
Crude materials	79	35	123	28	7.0 (4.6)	1 042	875	1 209	8	93.0 (4.4)	1 121	942	1 300	8	100.0 (4.5)
Fabricated materials	238	152	324	18	3.5 (14.0)	6 493	5 974	7 012	4	96.5 (27.7)	6 731	6 327	7 135	3	100.0 (26.8)
And products	1 242	1 043	1 441	8	8.2 (72.8)	13 906	13 072	14 740	3	91.8 (59.4)	15 148	14 239	16 057	3	100.0 (60.3)
total	1 707	1 502	1 912	6	6.8 (100.0)	23 424	22 487	24 361	2	93.2 (100.0)	25 131	24 126	26 136	2	100.0 (100.0)
Overseas															
Live animals	-	-	-	-	- (-)	2	0	5	87	100.0 (0.1)	2	0	5	87	100.0 (0.1)
Food, feed, beverages & tobacco	609	548	670	5	42.2 (12.8)	834	767	901	4	57.8 (13.4)	1 443	1 328	1 558	4	100.0 (13.2)
Crude materials	166	136	196	9	49.0 (3.5)	173	142	204	9	51.0 (2.8)	339	292	386	7	100.0 (3.1)
Fabricated materials	1 358	1 249	1 467	4	41.6 (28.7)	1 908	1 794	2 022	3	58.4 (30.7)	3 266	3 135	3 397	2	100.0 (29.8)
And products	2 606	2 502	2 710	2	44.2 (55.0)	3 288	3 156	3 420	2	55.8 (53.0)	5 894	5 658	6 130	2	100.0 (53.9)
total	4 739	4 549	4 929	2	43.3 (100.0)	6 205	5 957	6 453	2	56.7 (100.0)	10 944	10 506	11 382	2	100.0 (100.0)

Notes:

1. Coefficients of variation (approximations), estimates and confidence intervals have been rounded off.
2. Percentages in brackets apply to column totals only.

Table 10

ESTIMATES OF THE NUMBER OF SHIPMENTS IN 1979 TRANSBORDER AND OVERSEAS IMPORT TRADE MOVING MULTIMODALLY AND UNIMODALLY
By Commodity Group

Type of Trade/ Commodity Gp.	Multimodal Movements					Unimodal Movements					Totals				
	estimate ('000)	confidence intervals (95% level) min. ('000)	max. ('000)	C.V. (%)	%	estimate ('000)	confidence intervals (95% level) min. ('000)	max. ('000)	C.V. (%)	%	estimate ('000)	confidence intervals (95% level) min. ('000)	max. ('000)	C.V. (%)	%
Transborder															
live animals	-	-	-	-	- (-)	7	0	16	63	100.0 (0.3)	7	0	16	63	100.0 (0.3)
food, feed, beverages & tobacco	4	0	11	83	1.8 (3.8)	215	168	262	11	98.2 (10.4)	219	171	267	11	100.0 (10.1)
crude materials	10	0	20	52	12.2 (9.4)	72	43	101	20	87.8 (3.5)	82	52	112	18	100.0 (3.8)
fabricated materials	14	1	29	52	2.4 (13.2)	570	502	638	6	97.6 (27.7)	584	514	654	6	100.0 (27.0)
end products	78	50	106	18	6.1 (73.6)	1 197	1 101	1 293	4	93.9 (58.1)	1 275	1 173	1 377	4	100.0 (58.8)
total	106	72	140	16	5.0 (100.0)	2 061	2 020	2 102	1	95.0 (100.0)	2 167	2 124	2 210	1	100.0 (100.0)
Overseas															
live animals	-	-	-	-	- (-)	-	-	-	-	- (-)	-	-	-	-	- (-)
food, feed, beverages & tobacco	30	21	39	15	37.5 (11.5)	50	39	61	11	62.5 (11.9)	80	66	94	9	100.0 (11.7)
crude materials	4	1	7	42	40.0 (1.5)	6	2	10	34	60.0 (1.4)	10	5	15	26	100.0 (1.5)
fabricated materials	65	53	77	9	42.5 (24.8)	88	74	102	8	57.5 (21.1)	153	138	168	5	100.0 (22.5)
end products	163	147	179	5	37.2 (62.2)	275	253	297	4	62.8 (65.6)	438	412	464	3	100.0 (64.3)
total	262	241	283	4	38.5 (100.0)	419	394	444	3	61.5 (100.0)	681	681	681	0	100.0 (100.0)

Notes:

1. Coefficients of variation (approximations), estimates and confidence intervals have been rounded off.
2. Percentages in brackets apply to column totals only.

Unlike the reliability indicators in transborder trade, C.V.'s for overseas estimates for the majority of commodity groupings were much better and ranged from very reliable to somewhat reliable.

6.6 Extent of Use of Multimodal Transport in Export Movements to Various Country Blocs

Canadian overseas export trade was also analysed from the point of view of those countries to which goods were moved multimodally. Since an individual country was too small a unit for which to provide estimates, countries of the world were classified into blocs and estimates of the proportion, by value and number, of the use of multimodal transport in total trade with these "country blocs" were produced.

The estimates revealed that 86 percent of the total value of Canadian exports to the Soviet Bloc, 67 percent of those to Africa and 66 percent of those to the Middle East moved by more than one mode of transport. With reference to the other country blocs, although a good portion of the total value of trade with the individual blocs moved multimodally, unimodal movements still dominated overall export trade with Europe (69%), Asia (72%), South America (54%), the Pacific Islands (73%), and Mexico and Central America (70%). In absolute value terms, multimodal movements to Europe accounted for the greatest proportion (49.4%) of the value of all movements of that kind to all country blocs combined. Multimodal movements of goods from Canada to Asia accounted for slightly less than half, by value, of those to Europe. C.V.'s generated for the above estimates indicated these to range from reliable to very reliable (see Tables 11 and 12).

In terms of the number of shipments, Canadian exports moving multimodally equalled or exceeded 50 percent in the cases of export shipments to the Middle East (78%), Asia (55%), the Soviet Bloc (50%) and South America (50%). The proportions of the number of shipments moving by various modal combinations to other country blocs were as follows: Africa, 44 percent, Pacific Islands, 44 percent, Mexico and Central America, 40 percent and Europe, 35 percent. In terms of multimodal shipments only, the number moving to Europe comprised the largest share (35%) of the total number of multimodal movements of exports overseas. C.V.'s associated with these shipment estimates were found to be less reliable, on the whole, than those exhibited by their corresponding value estimates.

6.7 Use of Multimodal Transport in Export Movements to Major Regions of the U.S.

Unlike exports to overseas markets, Canadian exports to various U.S. regions did not utilize multimodal transport as much. In fact, the value of exports moving by more than one mode of transport did not exceed 7.4 percent of the total value of export trade to any one of the six designated regions of the U.S. In absolute terms, 45 percent of the value of all export goods moving by various modal combinations to all six regions combined was destined for the U.S. North Central region. The figures

Table 11

ESTIMATES OF THE VALUE OF CANADIAN EXPORTS TO THE U.S. AND OVERSEAS
MOVING MULTIMODALLY AND UNIMODALLY IN 1979
By Region of Destination

Type of Trade/ Region of Destination	Multimodal Movements					Unimodal Movements					Totals				
	estimate (millions $)	confidence intervals (95% level) min. (millions $)	max.	C.V. (%)	%	estimate (millions $)	confidence intervals (95% level) min. (millions $)	max.	C.V. (%)	%	estimate (millions $)	confidence intervals (95% level) min. (millions $)	max.	C.V. (%)	%
Transborder															
U.S. Northeast	201	101	302	25	2.4 (25.0)	8 237	7 578	8 896	4	97.6 (39.5)	8 438	7 763	9 113	4	100 (39.0)
Northwest	12	0	39	112	0.8 (1.5)	1 582	1 329	1 835	8	99.2 (7.6)	1 594	1 339	1 849	8	100 (7.4)
Southeast	108	32	184	35	5.0 (13.5)	2 043	1 716	2 370	8	95.0 (9.8)	2 151	1 807	2 495	8	100 (9.9)
Southwest	38	0	81	56	1.2 (4.7)	3 118	2 744	3 492	6	98.8 (15.0)	3 156	2 777	3 535	6	100 (14.6)
North Central	361	231	491	18	7.0 (45.0)	4 812	4 331	5 293	5	93.0 (23.1)	5 173	4 656	5 690	5	100 (23.9)
Midwest	83	18	148	39	7.4 (10.3)	1 044	814	1 274	11	92.6 (5.0)	1 127	879	1 375	11	100 (5.2)
total	803	610	996	12	3.7 (100)	20 836	20 003	21 669	2	96.3 (100)	21 639	20 773	22 505	2	100 (100)
Overseas															
Europe	2 177	2 090	2 264	2	30.6 (49.4)	4 939	4 741	5 137	2	69.4 (55.8)	7 116	6 974	7 256	1	100 (53.7)
Soviet Bloc	86	71	101	9	86.0 (2.0)	14	6	22	28	14.0 (0.2)	100	82	118	9	100 (0.8)
Mid-East and East Africa	302	272	332	5	66.4 (6.9)	153	135	171	6	33.6 (1.7)	455	419	491	4	100 (3.4)
Africa	269	242	296	5	66.9 (6.1)	133	109	157	9	33.1 (1.5)	402	362	442	5	100 (3.0)
Asia	950	893	1 007	3	27.7 (21.6)	2 475	2 376	2 574	2	72.3 (28.0)	3 425	3 288	3 562	2	100 (25.8)
Pacific Islands	95	78	112	9	26.7 (2.2)	261	235	287	5	73.3 (2.9)	356	320	392	5	100 (2.7)
South America	305	275	336	5	45.7 (6.9)	362	326	398	5	54.3 (4.1)	667	627	707	3	100 (5.0)
Mexico, Central America and West Indies	222	195	249	6	30.2 (4.9)	514	473	555	4	69.8 (5.8)	736	692	780	3	100 (5.6)
total	4 406	4 230	4 582	2	33.2 (100)	8 851	8 674	9 028	1	66.8 (100)	13 257	12 992	13 522	1	100 (100)
Total	5 209	-	-	-	- -	29 687	-	-	-	- -	34 896	-	-	-	- -

Notes:

1. Coefficients of variation (approximations), estimates and confidence intervals have been rounded off.
2. Percentages appearing in brackets apply to column totals only.
3. Totals appearing in this table may not correspond exactly to those in other tables because of the varying impact of rounding those detailed estimates which contribute to the totals.

Table 12

ESTIMATES OF THE NUMBER OF SHIPMENTS OF CANADIAN EXPORTS TO THE U.S. AND OVERSEAS MOVING MULTIMODALLY AND UNIMODALLY IN 1979
By Region of Destination

Type of Trade/ Region of Destination	Multimodal Movements					Unimodal Movements					Totals				
	estimate ('000)	confidence intervals (95% level) min. ('000)	confidence intervals (95% level) max. ('000)	C.V. (%)	%	estimate ('000)	confidence intervals (95% level) min. ('000)	confidence intervals (95% level) max. ('000)	C.V. (%)	%	estimate ('000)	confidence intervals (95% level) min. ('000)	confidence intervals (95% level) max. ('000)	C.V. (%)	%
Transborder															
U.S. Northeast	12	3	21	39	3.3 (30.8)	351	323	379	4	96.7 (34.3)	363	334	392	4	100 (34.2)
Northwest	-	-	-	-	- (-)	109	83	135	12	100.0 (10.7)	109	83	135	12	100 (10.3)
Southeast	3	0	7	72	2.6 (7.7)	114	87	141	12	97.4 (11.2)	117	89	145	12	100 (11.0)
Southwest	3	0	7	72	4.3 (7.7)	67	48	86	14	95.7 (6.6)	70	50	90	14	100 (6.6)
North Central	19	9	29	27	5.8 (48.7)	310	273	347	6	94.2 (30.3)	329	290	368	6	100 (31.0)
Midwest	2	0	6	88	2.7 (5.1)	71	51	91	14	97.3 (6.9)	73	53	93	14	100 (6.9)
total	39	24	54	19	3.7 (100)	1 022	1 002	1 042	1	96.3 (100)	1 061	1 040	1 082	1	100 (100)
Overseas															
Europe	40	34	46	8	34.5 (35.4)	76	68	84	5	65.5 (50.3)	116	107	125	4	100 (43.9)
Soviet Bloc	1	0	2	53	50.0 (0.9)	1	0	2	53	50.0 (0.7)	2	0	4	38	100 (0.8)
Mid-East and East Africa	7	4	10	20	77.8 (6.2)	2	0	4	38	22.2 (1.3)	9	6	12	18	100 (3.4)
Africa	4	2	6	27	44.4 (3.5)	5	3	7	24	55.6 (3.3)	9	6	12	18	100 (3.4)
Asia	26	21	31	9	55.3 (23.0)	21	16	26	11	44.7 (13.9)	47	40	54	7	100 (17.8)
Pacific Islands	7	4	10	20	43.8 (6.2)	9	6	12	18	56.2 (6.0)	16	12	20	11	100 (6.1)
South America	9	6	12	18	50.0 (8.0)	9	6	12	18	50.0 (6.0)	18	14	22	11	100 (6.8)
Mexico, Central America and West Indies	19	15	23	11	40.4 (16.8)	28	23	33	9	59.6 (18.5)	47	40	54	7	100 (17.8)
total	113	104	122	4	42.8 (100)	151	145	157	2	57.2 (100)	264	259	269	1	100 (100)
Total	152	-	-	-	- -	1 173	-	-	-	- -	1 325	-	-	-	- -

Notes:

1. Coefficients of variation (approximations), estimates and confidence intervals have been rounded off.
2. Percentages appearing in brackets apply to column totals only.
3. Totals appearing in this table may not correspond exactly to those in other tables because of the varying impact of rounding those detailed estimates which contribute to the totals.

presented in Table 11 give a clear indication of the overall dominance of unimodal transport of Canadian export goods to U.S. markets. Although the C.V.'s associated with multimodal transport estimates generated, for the most part, are unreliable, those estimates attributed to unimodal movements range from very reliable to somewhat reliable.

Estimates of the number of shipments moving multimodally as opposed to unimodally to the various U.S. regions simply reinforce the findings expressed in the paragraph above concerning the dominance of unimodal transport in transborder export trade. The C.V.'s associated with these figures exhibit values and levels of reliability which are similar to those described above.

6.8 Use of More than One Mode of Transport in Import Movements to Canada from Other Country Blocs

Estimates, both in terms of value and number of shipments, for Canadian imports from overseas, by country bloc, exhibited patterns similar to those seen for flows of Canadian exports in the opposite direction. The number of shipments moved multimodally, as a proportion of the total number of shipments from individual country blocs, was estimated to be 100 percent in the case of Africa, 50 percent in the case of the Middle East, 53 percent for the Soviet Bloc, 43 percent for Asia, 38 percent for South America, 34 percent for the Pacific Islands, 35 percent for Europe and 28 percent for Mexico and Central America. In absolute terms, multimodal movements from Europe and Asia to Canada accounted for nine-tenths of total multimodal movements from all country blocs.

Regarding the value of import movements from overseas, it was estimated that trade from Africa (100%), the Middle East (73%), the Soviet Bloc (65%) and the Pacific Islands (51%) moving by various modal combinations exceeded 50 percent of the total value of estimated import trade between these country blocs and Canada. Other country blocs' proportions of multimodal import trade, by value, was estimated to range between 25 percent and 47 percent of the total value of trade for individual blocs. Again, in absolute terms, 88 percent of the total value of multimodal import movements from overseas to Canada was accounted for by movements from Europe and Asia alone.

Measures of the reliability of the above estimates indicated figures to range from reliable to very reliable for those country blocs comprising a significant portion of the total movements, either multimodal or unimodal, and unreliable for those country blocs which contributed little to the overall totals. Exact C.V.'s are presented in Tables 13 and 14 along with the detailed figures.

6.9 Portion of Import Trade from Major U.S. Regions Employing More than One Mode of Transport

As was the case for Canadian exports to U.S. regions, the role of multimodal transport in the movement of goods from U.S. regions to destinations in Canada appears to be minimal given the estimates produced.

In none of the individual regions' trade with Canada does the number of shipments moving multimodally exceed 7 percent of the total number of shipments. Estimates of the value of trade transported multimodally from these regions to Canadian destinations are also consistent with the preceding estimates, again emphasizing the overwhelming dominance of unimodal transport in Canadian-U.S. trade.

Measures of the reliability of the estimates for unimodal transport were found to range from reliable to very reliable but those for multimodal transport proved to be somewhat reliable with the exception of one or two which proved to be unreliable (see Tables 13 and 14 for specific C.V.'s).

6.10 Modal Combinations Employed in Canadian Export Trade

6.10.1 Transborder Trade

One of the major objectives of the study was to identify various modal combinations* and the frequency with which they were employed in multimodal movements in Canadian transborder and overseas trade. The results appear in Tables 15 and 16.

In transborder trade, reliable estimates of modal combinations used in multimodal transport movements proved elusive for the most part. With the exception of estimates of the total number of shipments (39 000) and their corresponding value (802 million $) in which various modal combinations were employed (and to which some degree of reliability could be attributed), most estimates of individual modal combinations were found to be unreliable primarily because of the rarity of multimodal movements in general. However estimates of multimodal movements employing rail and road modes in combination were found to be somewhat reliable (C.V. of 14%) in the case of the value and of limited reliability (C.V. of 27%) in the case of the number of shipments. This also happened to be the leading modal combination used in transborder export trade in 1979 accounting for a total of 24 000 of 39 000 multimodal shipments (62%) and 596 million dollars of 802 million dollars (74%) of the total estimated value of all multimodal movements in the same trade. The water-road combination was a distant second with 26 percent of the total number of shipments and 15 percent of the total value, but both estimates for this combination proved to be unreliable. Estimates were also produced for other modal combinations (water-rail, air-road and water-unknown); however, these too were found to be unreliable. What their presence does indicate, though, is the fact that they were used in transborder trade to some degree. Movements employing more than two modes of transport, in transborder export trade, were found to be non-existent.

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* The way in which modal combinations have been described in the text gives no indication of the sequence in which the modes were actually employed. For example, a description of rail-road combinations refers to both those multimodal movements employing rail as the "initial" mode and road as the "secondary" mode and those movements employing road as the "initial" mode and rail as the "secondary" mode.

Table 13

ESTIMATES OF THE VALUE OF CANADIAN IMPORTS FROM THE U.S. AND OVERSEAS
MOVING MULTIMODALLY AND UNIMODALLY IN 1979
By Region of Origin

Type of Trade/ Region of Origin	Multimodal Movements					Unimodal Movements					Totals				
	estimate (millions $)	confidence intervals (95% level) min. (millions $)	max. (millions $)	C.V. (%)	%	estimate (millions $)	confidence intervals (95% level) min. (millions $)	max. (millions $)	C.V. (%)	%	estimate (millions $)	confidence intervals (95% level) min. (millions $)	max. (millions $)	C.V. (%)	%
Transborder															
U.S. Northeast	359	266	452	13	5.2 (21.0)	6 493	5 974	7 012	4	94.8 (27.7)	6 852	6 441	7 263	3	100 (27.3)
Northwest	-	-	-	-	- (-)	1 057	888	1 226	8	100.0 (4.5)	1 057	888	1 226	8	100 (4.2)
Southeast	52	15	89	36	1.9 (3.0)	2 729	2 456	3 002	5	98.1 (11.7)	2 781	2 503	3 059	5	100 (11.1)
Southwest	259	181	337	15	6.2 (15.2)	3 942	3 627	4 257	4	93.8 (16.8)	4 201	3 865	4 537	4	100 (16.7)
North Central	763	626	900	9	9.0 (44.7)	7 747	7 282	8 211	3	91.0 (33.1)	8 510	7 999	9 021	3	100 (33.9)
Midwest	274	192	356	15	15.8 (16.1)	1 456	1 223	1 689	8	84.2 (6.2)	1 730	1 522	1 938	6	100 (6.8)
total	1 707	1 502	1 912	6	6.8 (100)	23 424	22 487	24 361	2	93.2 (100)	25 131	24 126	26 136	2	100 (100)
Overseas															
Europe	2 222	2 089	2 355	3	40.7 (46.9)	3 243	3 113	3 373	2	59.3 (52.3)	5 465	5 246	5 684	2	100 (49.9)
Soviet Bloc	200	164	236	9	64.9 (4.2)	108	82	134	12	35.1 (1.7)	308	265	351	7	100 (2.8)
Mid-East and East Africa	8	1	15	44	72.7 (0.2)	3	0	7	71	27.3 (0.1)	11	2	20	39	100 (0.1)
Africa	2	0	5	87	100.0 (0.1)	-	-	-	-	- (-)	2	0	5	87	100 (0.1)
Asia	1 948	1 831	2 065	3	46.1 (41.1)	2 280	2 143	2 417	3	53.9 (36.7)	4 228	4 059	4 397	2	100 (38.6)
Pacific Islands	139	106	172	12	50.5 (2.9)	136	103	169	12	49.5 (2.2)	275	237	314	7	100 (2.5)
South America	49	32	66	17	24.7 (1.0)	149	113	185	12	75.3 (2.4)	198	162	234	9	100 (1.8)
Mexico, Central America and West Indies	171	140	202	9	37.4 (3.6)	286	246	326	7	62.6 (4.6)	457	402	512	6	100 (4.2)
total	4 739	4 549	4 929	2	43.3 (100)	6 205	5 957	6 453	2	56.7 (100)	10 944	10 506	11 382	2	100 (100)
Total	6 446	-	-	-	- -	29 629	-	-	-	- -	36 075	-	-	-	- -

Notes:

1. Coefficients of variation (approximations), estimates and confidence intervals have been rounded off.
2. Percentages appearing in brackets apply to column totals only.
3. Totals appearing in this table may not correspond exactly to those in other tables because of the varying impact of rounding those detailed estimates which contribute to the totals.

Table 14

ESTIMATES OF THE NUMBER OF SHIPMENTS OF CANADIAN IMPORTS FROM THE U.S. AND OVERSEAS
MOVING MULTIMODALLY AND UNIMODALLY IN 1979
By Region of Origin

Type of Trade/ Region of Origin	Multimodal Movements					Unimodal Movements					Totals				
	estimate ('000)	confidence intervals (95% level) min. ('000)	confidence intervals (95% level) max. ('000)	C.V. (%)	%	estimate ('000)	confidence intervals (95% level) min. ('000)	confidence intervals (95% level) max. ('000)	C.V. (%)	%	estimate ('000)	confidence intervals (95% level) min. ('000)	confidence intervals (95% level) max. ('000)	C.V. (%)	%
Transborder															
U.S. Northeast	33	13	53	30	5.0 (30.8)	641	564	718	6	95.0 (31.1)	674	607	741	5	100 (31.1)
Northwest	-	-	-	-	- (-)	95	65	125	16	100.0 (4.6)	95	65	125	16	100 (4.4)
Southeast	2	0	6	110	1.0 (1.9)	227	177	277	11	99.0 (11.0)	229	179	279	11	100 (10.6)
Southwest	23	6	40	37	6.7 (21.5)	321	263	379	9	93.3 (15.6)	344	282	406	9	100 (15.9)
North Central	43	21	65	26	5.9 (40.2)	687	618	756	5	94.1 (33.3)	730	657	803	5	100 (33.7)
Midwest	6	0	14	68	6.2 (5.6)	90	59	121	17	93.8 (4.4)	96	65	127	16	100 (4.3)
total	107	73	141	16	5.0 (100)	2 061	2 020	2 102	1	95.0 (100)	2 168	2 125	2 211	1	100 (100)
Overseas															
Europe	131	110	152	8	35.0 (50.2)	243	219	276	5	65.0 (58.0)	374	352	396	3	100 (55.0)
Soviet Bloc	10	5	15	26	52.6 (3.8)	9	4	14	28	47.4 (2.1)	19	12	26	18	100 (2.8)
Mid-East and East Africa	1	0	3	84	50.0 (0.4)	1	0	3	84	50.0 (0.3)	2	0	4	59	100 (0.3)
Africa	1	0	3	84	100.0 (0.4)	-	-	-	-	- (-)	1	0	3	84	100 (0.2)
Asia	107	90	124	8	43.0 (41.0)	142	119	165	8	57.0 (33.9)	249	224	274	5	100 (36.6)
Pacific Islands	3	0	6	48	34.0 (1.15)	6	2	10	34	66.0 (1.4)	9	4	14	28	100 (1.3)
South America	3	0	6	48	37.5 (1.15)	5	1	9	37	62.5 (1.2)	8	3	13	29	100 (1.2)
Mexico, Central America and West Indies	5	1	9	37	27.8 (1.9)	13	6	20	26	72.2 (3.1)	18	12	24	18	100 (2.6)
total	261	240	282	4	38.4 (100)	419	394	444	3	61.6 (100)	680	666	694	1	100 (100)
Total	368	-	-	-	- -	2 480	-	-	-	- -	2 848	-	-	-	- -

Notes:

1. Coefficients of variation (approximations), estimates and confidence intervals have been rounded off.
2. Percentages appearing in brackets apply to column totals only.
3. Totals appearing in this table may not correspond exactly to those in other tables because of the varying impact of rounding those detailed estimates which contribute to the totals.

Finally, an anomaly was noted during the early stages of the study and is reflected in Tables 15 and 16 in the form of estimates of "unique" unimodal movements where two different carriers representing the same transport mode were used in a single movement. Irregularities of this nature were estimated to occur half as frequently as multimodal movements in transborder trade (27 000 shipments compared to 39 000 multimodal shipments, with a corresponding value of 403 million $ as compared to a multimodal value of 802 million $). These "unique" unimodal movements primarily involved the rail mode (over 80% of the total number of shipments and 90% of the value in this category) to whose estimates some degree of reliability can be attached (27% and 18% respectively). Movements of a similar type involving the road mode were also estimated but found to be unreliable (C.V.'s of 55% and 64%).

6.10.2 Overseas Trade

Estimates produced for modal combinations employed in overseas export trade proved to be much more reliable than those for transborder export trade, especially those related to value. Of 114 000 multimodal shipments in overseas export trade in 1979, the water-road combination was estimated to be employed in 81 000 or in 71 percent of the movements. The air-road combination, employed in 14 percent of all movements was a distant second. Overall, 84 percent of all multimodal movements employed the water mode as one of the two or more modes used. From a value standpoint, multimodal movements in which the water-road combination was utilized accounted for 73 percent (3.2 billion $) of the total value of multimodal movements in overseas export trade in 1979. Water-rail movements accounted for another 17 percent (741 million $) of the same total value.

Shipments where more than two modes of transport were utilized totalled some 2 000 with a corresponding value of 73 million dollars in 1979.

Finally, movements involving two carriers of the same mode spread fairly evenly over the air and water modes, accounting for some 2 000 shipments and 92 million dollars of the total value of overseas export trade in 1979.

As can be seen in Tables 15 and 16, the majority of the estimates in this section were found to range from unreliable to very reliable with value estimates exhibiting more reliability than those for the number of shipments.

6.11 Modal Combinations Employed in Canadian Import Trade

6.11.1 Transborder Trade

Of a total number of multimodal shipments in transborder import trade of 106 000, 46 percent employed a road-unknown modal combination. This estimate was judged to be somewhat reliable (C.V. = 23%) unlike estimates of the number of shipments for all other modal combinations employed in transborder trade which were classified as unreliable. However,

Table 15

ESTIMATES OF THE VALUE OF CANADIAN EXPORT TRADE MOVING BY DIFFERENT MODAL COMBINATIONS IN 1979

Modal Combinations	Transborder Trade					Overseas Trade				
	estimate (millions $)	confidence intervals (95% level) min (million $)	max	C.V. (%)	%	estimate (millions $)	confidence intervals (95% level) min (millions $)	max	C.V. (%)	%
water-road	120	36	204	35	15.0	3 232	3 103	3 361	2	73.4
water-rail	25	0	57	64	3.1	741	697	785	3	16.8
water-air	–	–	–	–	–	–	–	–	–	–
water-unknown	12	0	39	112	1.5	61	48	74	11	1.4
air-rail	–	–	–	–	–	2	0	5	63	0.04
air-road	49	0	98	50	6.1	295	266	325	5	6.7
air-unknown	–	–	–	–	–	–	–	–	–	–
rail-road	596	429	763	14	74.3	–	–	–	–	–
rail-unknown	–	–	–	–	–	–	–	–	–	–
road-unknown	–	–	–	–	–	1	0	3	89	0.02
more than two modes	–	–	–	–	–	73	57	89	11	1.6
Total Export Trade Employing Various Modal Combinations*	802	610	994	12	100	4 405	4 229	4 581	2	100
Unique Unimodal										
water-water	–	–	–	–	–	38	27	49	14	41.3
rail-rail	369	236	502	18	91.6	–	–	–	–	–
road-road	34	0	78	64	8.4	–	–	–	–	–
air-air	–	–	–	–	–	54	40	68	13	58.7
Total Export Trade Employing Unique Unimodal Combinations*	403	258	548	18	100	92	75	109	9	100

* Confidence Intervals calculated for "Total Export Trade Employing Various Modal Combinations" and "Total Export Trade Employing Unique Unimodal Combinations" do not equal the sum of the minimums and maximums for the individual modal combinations because they are independent estimates with their own confidence intervals and associated coefficients of variation.

Note:

1. Coefficients of variation (approximations), estimates and confidence intervals have been rounded off.

Table 16

ESTIMATES OF THE NUMBER OF SHIPMENTS OF CANADIAN EXPORT TRADE MOVING BY DIFFERENT MODAL COMBINATIONS IN 1979

Modal Combinations	Transborder Trade					Overseas Trade				
	estimate ('000)	confidence intervals (95% level) min ('000)	max	C.V. (%)	%	estimate ('000)	confidence intervals (95% level) min ('000)	max	C.V. (%)	%
water-road	10	2	18	39	25.6	81	73	89	5	71.1
water-rail	1	0	3	124	2.6	12	8	16	17	10.5
water-air	-	-	-	-	-	-	-	-	-	-
water-unknown	-	-	-	-	-	3	1	5	31	2.6
air-rail	-	-	-	-	-	-	-	-	-	-
air-road	4	0	9	62	10.3	16	12	20	11	14.0
air-unknown	-	-	-	-	-	-	-	-	-	-
rail-road	24	11	37	27	61.5	-	-	-	-	-
rail-unknown	-	-	-	-	-	-	-	-	-	-
road-unknown	-	-	-	-	-	-	-	-	-	-
more than two modes	-	-	-	-	-	2	0	4	38	1.8
Total Export Trade Employing Various Modal Combinations*	39	24	54	19	100	114	105	123	4	100
Unique Unimodal										
water-water	-	-	-	-	-	1	0	2	53	50.0
rail-rail	22	10	34	27	81.5	-	-	-	-	-
road-road	5	0	11	55	18.5	-	-	-	-	-
air-air	-	-	-	-	-	1	0	2	53	50.0
Total Export Trade Employing Unique Unimodal Combinations*	27	15	39	22	100	2	0	4	38	100

* Confidence Intervals calculated for "Total Export Trade Employing Various Modal Combinations" and "Total Export Trade Employing Unique Unimodal Combinations" do not equal the sum of the minimums and maximums for the individual modal combinations because they are independent estimates with their own confidence intervals and associated coefficients of variation.

Note:

1. Coefficients of variation (approximations), estimates and confidence intervals have been rounded off.

in terms of value, the majority of estimates for modal combinations used were considered to be reliable to varying degrees. A perusal of Tables 17 and 18 revealed that, of all possible modal combinations, the road-unknown modal combination ranked first (537 million $), by value, in multimodal movements, with air-road combinations second (381 million $), rail-unknown combinations third (287 million $) and water-road combinations fourth (211 million $). Air-rail and air-unknown combinations were also employed in transborder trade but their contributions to the total were estimated to be small. Movements involving two or more modes of transport were found to be employed but estimates produced proved unreliable.

With regard to "unique" unimodal movements involving two different carriers, movements using the road mode were estimated to be the most significant of the four, accounting for some 33 000 shipments with a corresponding value of 211 million dollars.

6.11.2 Overseas Trade

In overseas import trade, the combination of water-road movements was found to dominate, accounting for 55 percent of the total number of multimodal shipments and the corresponding value. Trailing considerably behind were water-rail movements with close to a quarter of the total shipments and 28 percent of the corresponding value. All other modal combinations accounted for small proportions of the total. All in all, multimodal movements involving water as a mode comprised 86 percent of total shipments and 95 percent of the total value of all multimodal movements in this trade.

Value estimates for the above, with few exceptions, proved to be reliable to varying degrees while most shipment estimates were considered to be unreliable. From Table 17, it can be seen that more than two modes of transport were employed in the movement of 120 million dollars in multimodal overseas import trade in 1979.

"Unique unimodal" movements appeared also in overseas import trade with water and road modes* accounting for some 102 million dollars in total value.

6.12 Number and Value of Canadian Multimodal Export Shipments Diverted Through or Transiting Other Countries before Arrival at Final Destinations Overseas

Diversion of one country's goods through another country before arriving at their final destination has in recent years been vehemently discussed because of perceived positive and negative economic ramifications for all countries affected. Since interest was expressed in knowing more

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* Overseas movements classified as "unique unimodal" were those movements towards Canada from Mexico and Central America.

Table 17

ESTIMATES OF THE VALUE OF CANADIAN IMPORT TRADE MOVING BY DIFFERENT MODAL COMBINATIONS IN 1979

Modal Combinations	Transborder Trade					Overseas Trade				
	estimate (millions $)	confidence intervals (95% level) min (million $)	confidence intervals (95% level) max (million $)	C.V. (%)	%	estimate (millions $)	confidence intervals (95% level) min (million $)	confidence intervals (95% level) max (million $)	C.V. (%)	%
water-road	211	135	287	18	12.4	2 582	2 479	2 685	2	54.5
water-rail	-	-	-	-	-	1 345	1 237	1 453	4	28.4
water-air	-	-	-	-	-	7	0	14	47	0.2
water-unknown	-	-	-	-	-	489	430	548	6	10.3
air-rail	14	0	36	79	0.8	9	2	16	41	0.2
air-road	381	282	480	13	22.3	146	111	181	12	3.1
air-unknown	66	26	106	30	3.9	6	0	12	50	0.1
rail-road	199	127	271	18	11.7	5	0	11	55	0.1
rail-unknown	287	201	373	15	16.8	25	14	36	22	0.5
road-unknown	537	419	655	11	31.4	5	0	11	55	0.1
more than two modes	12	0	31	79	0.7	120	91	149	12	2.5
Total Import Trade Employing Various Modal Combinations*	1 707	1 502	2 014	6	100	4 739	4 549	4 929	2	100
Unique Unimodal										
water-water	-	-	-	-	-	58	39	77	16	56.9
rail-rail	7	0	20	95	3.0	-	-	-	-	-
road-road	211	135	287	18	89.8	44	27	61	19	43.1
air-air	17	0	36	56	7.2	-	-	-	-	-
Total Import Trade Employing Unique Unimodal Combinations*	235	150	320	18	100	102	78	126	12	100

* Confidence Intervals calculated for "Total Import Trade Employing Various Modal Combinations" and "Total Import Trade Employing Unique Unimodal Combinations" do not equal the sum of the minimums and maximums for the individual modal combinations because they are independent estimates with their own confidence intervals and associated coefficients of variation.

Note:

1. Coefficients of variation (approximations), estimates and confidence intervals have been rounded off.

Table 18

ESTIMATES OF THE NUMBER OF SHIPMENTS OF CANADIAN IMPORT TRADE MOVING BY DIFFERENT MODAL COMBINATIONS IN 1979

Modal Combinations	Transborder Trade					Overseas Trade				
	estimate ('000)	confidence intervals (95% level) min ('000)	max	C.V. (%)	%	estimate ('000)	confidence intervals (95% level) min ('000)	max	C.V. (%)	%
water-road	10	0	20	52	9.4	143	120	166	8	54.6
water-rail	-	-	-	-	-	61	49	73	10	23.3
water-air	-	-	-	-	-	1	0	2	84	0.4
water-unknown	-	-	-	-	-	19	12	26	18	7.3
air-rail	3	0	9	96	2.8	3	0	6	48	1.1
air-road	12	0	24	52	11.3	20	13	27	18	7.6
air-unknown	15	4	26	37	14.2	3	0	6	48	1.1
rail-road	11	0	22	52	10.4	1	0	2	84	0.4
rail-unknown	2	0	4	110	1.9	1	0	2	84	0.4
road-unknown	49	26	72	23	46.2	3	0	6	48	1.1
more than two modes	4	0	11	83	3.8	7	3	11	31	2.7
Total Import Trade Employing Various Modal Combinations*	106	72	140	16	100	262	241	283	4	100
Unique Unimodal										
water-water	-	-	-	-	-	4	1	7	42	66.7
rail-rail	3	0	9	96	7.7	-	-	-	-	-
road-road	33	13	53	30	84.6	2	0	4	59	33.3
air-air	3	0	9	96	7.7	-	-	-	-	-
Total Import Trade Employing Unique Unimodal Combinations*	39	19	59	26	100	5.6	2	10	34	100

* Confidence Intervals calculated for "Total Import Trade Employing Various Modal Combinations" and "Total Import Trade Employing Unique Unimodal Combinations" do not equal the sum of the minimums and maximums for the individual modal combinations because they are independent estimates with their own confidence intervals and associated coefficients of variation.

Note:

1. Coefficients of variation (approximations), estimates and confidence intervals have been rounded off.

about the magnitude of Canadian trade diverted* in the context of multimodal movements, an attempt was made to quantify the number of shipments and the total value of Canadian multimodal export trade** affected. As well, estimates of Canadian multimodal trade transiting other countries before arriving at final destinations were also produced.

With reference to this portion of export trade, estimates indicate that some 45 000 shipments with a corresponding value of approximately 1 billion dollars were either diverted through or transited other countries*** before arriving at their final destinations. These accounted for 17 percent and 8 percent of the total number of shipments and total value of all overseas exports respectively in 1979. Of that portion of overseas export trade estimated to be moving multimodally (that is 115 000 shipments with a corresponding value of 4.4 billion $), the amount of trade diverted or transiting accounted for 39 percent of total multimodal shipments and 24 percent of their total value. According to Tables 19 and 20, almost all Canadian overseas exports affected appear to have been diverted, at least initially, through the U.S. If further diversions or transits occurred in later stages of a movement they were not noted**** on Canadian Customs documents. As indicated above, with the exception of an insignificant portion of trade transiting Panama, the diversion of Canadian export cargo destined for overseas markets was reliably estimated (C.V. of 8% in the case of the number of shipments and 3% in the case of value) with the majority of this cargo being diverted through four states: New York (29 000 shipments with a corresponding value of 599 million $), Washington (10 000 shipments worth 199 million $), Michigan (3 000 shipments totalling

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* Diversion, in the context of this report, is defined as the movement of Canadian exports and imports through the United States on their way to final destinations overseas (i.e. exports) or in Canada (i.e. imports). In contrast, Canadian trade with nations in other parts of the world moving through a country other than that of origin or destination of the goods is referred to as "transiting" another country on its way to final destinations in Canada or elsewhere.

** The estimates produced pertain only to that portion of total overseas export trade included in the sample.

*** There may have been other transits or diversions of goods through countries other than the U.S.; however, they have not been noted possibly because, many times, the Canadian exporter has little control over the "actual" routing patterns of the goods after they leave the U.S. Often, routing of exports may be left to the carrier, consignee or his agent and this information need not appear on the Canadian Customs document in its entirety.

**** In some cases further diversions or transits were noted on Customs documents; however, their proportion in the sample was so small that no worthwhile estimates could be produced from this scant information. It is assumed that "secondary" diversions or transits are of little significance judging from their infrequent occurrence.

Table 19

ESTIMATES OF THE VALUE OF 1979 CANADIAN MULTIMODAL EXPORT TRADE DIVERTED THROUGH OR TRANSITING ANOTHER COUNTRY BEFORE ARRIVING AT FINAL DESTINATION

Third Country	Transborder Trade*					Overseas Trade				
	estimate (mil. $)	confidence intervals (95% level) min (mil. $)	max	C.V. (%)	%	estimate (mil. $)	confidence intervals (95% level) min (mil. $)	max	C.V. (%)	%
U.S.A.										
New York	5 510	5 069	5 951	4	49.9	599	551	647	4	57.6
Michigan	2 907	2 558	3 256	6	26.3	79	63	95	10	7.6
Minnesota	810	616	1 004	12	7.3	-	-	-	-	-
Washington	652	482	822	13	5.9	199	175	223	6	19.1
Maine	438	280	596	18	4.0	6	2	10	36	0.6
Vermont	349	209	489	20	3.2	1	0	3	89	0.1
N. Dakota	222	111	333	25	2.0	-	-	-	-	-
Montana	87	23	151	37	0.8	14	6	22	28	1.3
New Jersey	53	0	106	50	0.5	-	-	-	-	-
Idaho	11	0	36	112	0.1	136	112	160	9	13.1
Indiana	5	0	21	158	-	-	-	-	-	-
Maryland	-	-	-	-	-	3	0	6	51	0.3
Other:										
Panama	-	-	-	-	-	3	0	6	51	0.3
Value of Trade Diverted or Transiting	11 044	10 381	11 707	3	100	1 040	978	1 102	3	100
Total Value of Trade	21 640	20 774	22 506	2	-	13 256	12 991	13 521	1	-
Diversions or Transits As A Percent Of Total Value of Multimodal Trade			**			23.6	-	-	-	-
Diversions or Transits As A Percent Of Total Value of Trade	51.0	-	-	-	-	7.8	-	-	-	-

* Figures refer to multimodal and unimodal movements combined transiting those states appearing in the table.

** Transits as a percent of the total value of multimodal trade cannot be calculated on the transborder side because multimodal and unimodal movements were combined.

Note:

1. Coefficients of variation (approximations), estimates and confidence intervals have been rounded off.

Table 20

ESTIMATES OF THE NUMBER OF SHIPMENTS IN 1979 CANADIAN MULTIMODAL EXPORT TRADE DIVERTED THROUGH OR TRANSITING ANOTHER COUNTRY BEFORE ARRIVING AT FINAL DESTINATION

Third Country	Transborder Trade*					Overseas Trade				
	estimate ('000)	confidence intervals (95% level) min ('000)	max	C.V. (%)	%	estimate ('000)	confidence intervals (95% level) min ('000)	max	C.V. (%)	%
U.S.A.										
New York	215	181	249	8	38.5	29	24	34	9	65.1
Michigan	156	131	181	8	27.9	3	1	5	31	6.7
Minnesota	68	49	87	14	12.2	-	-	-	-	-
Washington	46	30	62	17	8.2	10	7	13	17	22.5
Maine	26	15	37	22	4.6	1	0	2	53	2.2
Vermont	24	11	37	27	4.3	0.3	0	0.6	53	0.7
N. Dakota	14	3	25	39	2.5	-	-	-	-	-
Montana	7	0.4	14	47	1.2	0.3	0	0.6	53	0.7
New Jersey	2	0	6	88	0.4	-	-	-	-	-
Idaho	1	0	3	124	0.2	0.3	0	0.6	53	0.7
Indiana	0.09	0	0.29	124	-	-	-	-	-	-
Maryland	-	-	-	-	-	0.3	0	0.6	53	0.7
Other:										
Panama	-	-	-	-	-	0.3	0	0.6	53	0.7
Number of Shipments Diverted or Transiting	559	525	593	3	100	45	37	52	8	100
Total Number of Shipments	1 061	1 040	1 082	1	-	264	264	264	0	-
Shipments Diverted or Transiting As A Percent Of Multimodal Shipments		**				39.0	-	-	-	-
Shipments Diverted or Transiting As A Percent Of All Export Shipments	52.7	-	-	-	-	16.9	-	-	-	-

* Figures refer to multimodal and unimodal movements combined transiting those states appearing in the table.

** Transits as a percent of the total number of shipments in multimodal trade cannot be calculated on the transborder side because multimodal and unimodal movements were combined.

Note:

1. Coefficients of variation (approximations), estimates and confidence intervals have been rounded off.

79 million $) and Idaho* (300 shipments totalling 136 million $). Combined, these four states accounted for 98 percent of the value of all diversions of Canadian export cargo through the U.S. in 1979. These latter figures appear to be reliable to varying degrees with C.V.'s ranging from 4 percent to 31 percent (value estimates). Most of the remaining estimates related to the diversion of Canadian export trade through states other than those mentioned above were found to be unreliable and thus are not presented here.

6.13 Routing of Canadian Transborder Export Trade to Final Destinations in the U.S.

In terms of transborder trade, estimates were also produced, by number of shipments and value, of those initial states (points of entry) through which goods passed on their way to a final destination in states other than the transit states. It was anticipated that, by examining this aspect, a good idea could be gained of the importance of various states as major gateways for Canadian exports to the U.S.

This section differs from the previous section in that, because multimodal movements were estimated to be such a small proportion of total transborder export trade and because goods moving multimodally and unimodally were obliged, in many cases, to transit border states to reach their final destinations, multimodal movements were necessarily combined with unimodal movements to the U.S. to produce the following estimates of the use of certain border states as gateways.

The major gateways, for both Canadian unimodal and multimodal export movements combined, according to the results of the study, were found to be New York (215 000 shipments with a value of some 5.5 billion $) followed not too closely by Michigan (156 000 shipments totalling 2.9 billion $), Minnesota (68 000 and 810 million $) and Washington (46 000 and 652 million $). Maine, Vermont and North Dakota were also found to be gateways for significant portions of Canadian export trade entering the U.S. but in no way comparable to those portions moving south through the previous four states. A good degree of reliability, judging from coefficients of variation generated, was attributed to estimates produced for the first group of states. Value estimates for the latter three states were also perceived to be of some reliability. Overall, some 11 billion dollars of Canadian export trade (one-half of the value of all transborder export trade considered in the sample) transited border states to reach final destinations. Close to 90 percent (9.9 billion $) of this value appeared to enter the U.S. through the four states of New York, Michigan, Minnesota and Washington.

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* The high estimates obtained for Idaho appear to be anomalies which escaped notice in the earlier stages of the study. Little importance should be attributed to the diversion of Canadian exports through Idaho.

6.14 Number and Value of Canadian Multimodal Overseas Imports Diverted Through or Transiting Another Country before Arriving in Canada

Unlike overseas exports, Canadian overseas import trade diverted through or transiting other countries before arriving in Canada was estimated to only be slightly more than half* the former. When viewed in terms of total overseas imports considered in the sample, diverted and transiting trade accounted for 5 percent of the number of shipments and 6 percent of the total value. Diverted or transiting shipments accounted for only 14 percent (36 000 of 262 000) of total multimodal import shipments and only 13 percent (602 million $ of 4.7 billion $) of the total value of these same shipments. Again, as in the case of overseas exports, the majority of these movements, by both number of shipments and value, were diversions through the U.S., especially New York and California which, combined, accounted for 86 percent, by value, of all diversions through all states. Transiting of Canadian imports through all other countries was estimated at slightly over half the value of the goods diverted through the U.S. (206 million $ as compared to 396 million $). The only notable countries through which goods transited were West Germany (138 million $) and the Netherlands (32 million $). In most cases, with the exceptions already noted above, estimates for diversion and transits of imports through all other countries were small and proved to be totally unreliable.

6.15 Routing of Canadian Transborder Import Trade From U.S. Origins

As was the case with overseas exports, transborder multimodal and unimodal movements were combined in an attempt to identify the frequency with which border states were used as points of exit for U.S. exports moving north to Canada. Generally speaking, it was discovered that some 883 000 shipments (either multimodal or unimodal) with a value of 11 billion dollars of a total of 2 million shipments totalling 25.1 billion dollars transited border states on their way to final destinations in Canada. Estimates revealed that, in terms of value, Michigan, followed closely by New York, was the predominant point of exit for U.S. exports to Canada. With reference to the number of shipments moving across the border, the position of the above two states was reversed (see Tables 21 and 22 for details). Of lesser importance, but significant nevertheless, were movements using border crossings in Washington and Montana. Together, the four states accounted for 88 percent of the total number of shipments and 90 percent of the total value of shipments transiting all border states into Canada. Measures of the reliability of the above estimates showed that they ranged from somewhat reliable to very reliable both from a value and number of shipments standpoint.

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* The diversion of Canadian imports has likely been underestimated largely because of the study data base's inability to identify movements of Canadian import goods through Seattle on their way to final destinations in Canada. Canadian Customs officials in Vancouver indicated that, unless bills of lading for movements through Seattle were perused, in many cases, this routing of Canadian imports would not have been obvious simply from an examination of the corresponding Customs Invoices.

Table 21

ESTIMATES OF THE VALUE OF 1979 CANADIAN MULTIMODAL IMPORT TRADE DIVERTED THROUGH OR TRANSITING ANOTHER COUNTRY BEFORE ARRIVING IN CANADA

Third Country	Transborder Trade*					Overseas Trade				
	estimate (mil. $)	confidence intervals (95% level) min (mil. $)	max	C.V. (%)	%	estimate (mil. $)	confidence intervals (95% level) min (mil. $)	max	C.V. (%)	%
U.S.A.										
New York	3 887	3 576	4 198	4	35	207	170	244	9	34.4
Michigan	4 008	3 687	4 329	4	36	-	-	-	-	-
Washington	1 293	1 086	1 500	8	11.6	8	1	15	44	1.3
Montana	881	775	987	6	7.9	7	0	14	47	1.2
N. Dakota	406	300	512	13	3.6	3	0	7	71	0.5
Maine	109	55	164	25	1.0	-	-	-	-	-
Minnesota	295	207	384	15	2.7	-	-	-	-	-
Vermont	109	55	164	25	1.0	-	-	-	-	-
Kentucky	11	0	28	79	0.1	-	-	-	-	-
Ohio	11	0	28	79	0.1	-	-	-	-	-
Wisconsin	54	15	93	36	0.5	-	-	-	-	-
Idaho	48	13	83	36	0.4	-	-	-	-	-
N. Carolina	11	0	28	79	0.1	-	-	-	-	-
California	8	0	22	89	-	133	101	165	12	22.1
Arkansas	1	0	5	251	-	-	-	-	-	-
Louisiana	-	-	-	-	-	5	0	11	55	0.8
Arizona	-	-	-	-	-	4	0	9	62	0.7
Florida	-	-	-	-	-	2	0	5	87	0.3
Oregon	-	-	-	-	-	2	0	5	87	0.3
Texas	-	-	-	-	-	25	14	36	22	4.2
Georgia	-	-	-	-	-	-	-	-	-	-
Others:										
West Germany	-	-	-	-	-	138	105	171	12	22.9
France	-	-	-	-	-	3	0	7	71	0.5
Netherlands	-	-	-	-	-	32	18	46	22	5.3
Austria	-	-	-	-	-	7	0	14	47	1.2
Spain	-	-	-	-	-	11	2	20	39	1.8
Singapore	-	-	-	-	-	13	3	23	39	2.2
China (P.R.)	-	-	-	-	-	-	-	-	-	-
Panama	-	-	-	-	-	-	-	-	-	-
Greenland	-	-	-	-	-	2	0	5	87	0.3
Value of Trade Diverted or Transiting	11 132	1 046	11 800	3	100	602	542	662	5	100
Total Value of Trade	25 131	24 126	26 136	2	-	10 944	10 506	11 382	2	-
Diversions or Transits As A Percent Of Total Value of Trade			**			12.7	-	-	-	-
Diversions or Transits As A Percent Of Total Value of Multimodal Trade	44.3	-	-	-	-	5.5	-	-	-	-

* Figures refer to multimodal and unimodal movements combined transiting those states appearing in the table.

** Transits as a percent of the total value of multimodal trade cannot be calculated on the transborder side because multimodal and unimodal movements were combined.

Note:

1. Coefficients of variation (approximations), estimates and confidence intervals have been rounded off.

Table 22

ESTIMATES OF THE NUMBER OF SHIPMENTS IN 1979 CANADIAN MULTIMODAL IMPORT TRADE DIVERTED THROUGH OR TRANSITING ANOTHER COUNTRY BEFORE ARRIVING IN CANADA

Third Country	Transborder Trade*					Overseas Trade				
	estimate ('000)	confidence intervals (95% level) min ('000)	max	C.V. (%)	%	estimate ('000)	confidence intervals (95% level) min ('000)	max	C.V. (%)	%
U.S.A.										
New York	385	331	439	7	43.6	10	5	15	26	27.8
Michigan	261	214	308	9	29.5	-	-	-	-	-
Washington	73	44	102	20	8.3	1	0	3	84	2.7
Montana	59	34	84	21	6.7	1	0	3	84	2.7
N. Dakota	26	10	42	30	2.9	1	0	3	84	2.7
Maine	21	5	37	37	2.4	-	-	-	-	-
Minnesota	19	5	33	37	2.1	-	-	-	-	-
Vermont	18	5	31	37	2.0	-	-	-	-	-
Kentucky	4	0	11	83	0.5	-	-	-	-	-
Ohio	4	0	11	83	0.5	-	-	-	-	-
Wisconsin	4	0	11	83	0.5	-	-	-	-	-
Idaho	4	0	11	83	0.5	-	-	-	-	-
N. Carolina	3	0	9	96	0.3	-	-	-	-	-
California	2	0	6	110	0.2	3	0.2	6	48	8.3
Arkansas	0.2	0	0.9	166	0.02	-	-	-	-	-
Louisiana	-	-	-	-	-	1	0	3	84	2.7
Arizona	-	-	-	-	-	1	0	3	84	2.7
Florida	-	-	-	-	-	1	0	3	84	2.7
Oregon	-	-	-	-	-	-	-	-	-	-
Texas	-	-	-	-	-	1	0	3	84	2.7
Georgia	-	-	-	-	-	-	-	-	-	-
Others:										
West Germany	-	-	-	-	-	9	4	14	28	25.0
France	-	-	-	-	-	2	0	4	59	5.6
Netherlands	-	-	-	-	-	2	0	4	59	5.6
Austria	-	-	-	-	-	1	0	3	84	2.7
Spain	-	-	-	-	-	1	0	3	84	2.7
Singapore	-	-	-	-	-	0.2	0	0.5	84	0.6
China (P.R.)	-	-	-	-	-	-	-	-	-	-
Panama	-	-	-	-	-	-	-	-	-	-
Greenland	-	-	-	-	-	1	0	3	84	2.7
Number of Shipments Diverted or Transiting	883	812	954	4	100	36	27	45	13	100
Total Number of Shipments	2 167	2 124	2 210	1	-	681	681	681	0	-
Shipments Diverted or Transiting As A Percent Of Multimodal Shipments			**		-	13.7	-	-	-	-
Shipments Diverted or Transiting As A Percent of All Import Shipments	40.7	-	-	-	-	5.3	-	-	-	-

* Figures refer to multimodal and unimodal movements combined transiting those states appearing in the table.

** Transits as a percent of the total number of shipments in multimodal trade cannot be calculated on the transborder side because multimodal and unimodal movements were combined.

Note:

1. Coefficients of variation (approximations), estimates and confidence intervals have been rounded off.

Chapter 7

MULTIMODAL TRANSPORT IN TRANSBORDER AUTOMOBILE TRADE

7.1 Importance of Transborder Export and Import Trade in Automobiles and their Parts

In 1979, Canadian imports of automobiles and their parts from the U.S. accounted for approximately 13.7 billion dollars* (22%) of a total import trade of 62.1 billion dollars [6, p.7] while exports to the U.S. of these same commodities comprised 10.7 billion dollars** (17%) of a total export trade of some 64 billion dollars. [5, p.7]

As mentioned in Chapter 3, because of the sizeable proportion of exports and imports of automobiles and their parts in comparison to the total value of all Canadian exports and imports, attempts were made to obtain information on the modes of transport used to move these commodities directly from those firms responsible for the greatest proportion of production. Accordingly, letters were sent to the firms*** in question explaining the intent as well as the basic concepts of the study and asking them for their cooperation in providing appropriate information on the use of unimodal and multimodal transport in the movement of goods of this nature. It was anticipated, however, that the decentralized nature of automobile manufacturers' operations might affect the ability of individual firms to provide specific figures and that the study team would be forced to rely on very general statistics upon which to base an analysis. However, when responses were received from three of the major firms in the industry, it was discovered that they varied from very general (where the use of modes of transport were provided but not in a form which would allow one to determine the relative proportions of the use of multimodal and unimodal transport) to very specific (where the firm actually supplied the figures originally requested).

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* U.S. totals for 29 individual commodities comprising automobiles and their parts.

** U.S. totals for 15 individual commodities comprising automobiles and their parts.

*** Both Canadian (for exports) and U.S. (for imports) automobile manufacturers were initially contacted for the required information. However, U.S. manufacturers indicated that, because of the nature of the trade in automobiles and their parts (i.e. almost all automobiles and their parts imported from the U.S. were done so through Canadian subsidiaries of U.S. firms), information on imports as well as exports of these commodities could be obtained from their Canadian counterparts.

7.2 Use of Multimodal Transport in the Movement of Automobiles and their Parts in Canadian Transborder Export and Import Trade

One firm responding to the study team's request for information indicated that approximately 70 percent of the vehicles produced at their assembly plants in Canada were shipped to the U.S. With regard to the modes used in moving these automobiles south, the firm simply said that, when the destination of the automobiles exceeded 250 to 300 miles, the rail mode was normally used to a rail ramp location; from there the units were then delivered to dealers by truck thus making these movements multimodal according to the definition stipulated in the MT Convention. When distances between the origin and destination were shorter than those indicated above, units were trucked to the border by Canadian carriers and beyond to final destination by U.S. truckers, making these movements "unique" unimodal movements (i.e. same mode, two different carriers) as defined in a previous section of the report. However, the firm qualified this information by stating that this pattern of transport could vary depending on the availability of equipment and timing. In addition, it was indicated that the same methods were employed in shipments from U.S. plants to Canadian dealers.

With reference to components (automobile parts), the same firm indicated that these were also shipped by rail or road depending upon "weights, distances and inventory floats, etc.". Again, however, these patterns could be altered by such events as shortages at the supplier's plants and equipment failures. Furthermore, unlike finished vehicles, components were usually loaded in a box car or trailer and delivered to destination in the same vehicle with only the "power" (tractor) being changed at the border.

This information indicates that this firm does move both automobiles and their component parts both unimodally and multimodally; however, the relative importance of either method cannot be exacted from the data provided.*

In a meeting with several officials of another major automobile manufacturer, they were able to provide the study team with a crude indication of the use of multimodal and unimodal transport in the movement of goods produced by proportion of carloadings and total freight bill but not by value. They revealed that, in export trade, approximately 75 percent of carloadings still moved unimodally, this percent being divided between unimodal rail (60%) and unimodal road (40%). According to them only 25 percent of their total carloadings in 1979 moved by a combination of rail and truck. No other modal combinations were mentioned as being employed by this firm in transborder trade.

In import trade, multimodal movements appear to be slightly more important than on the export side accounting for 40 percent of all carloadings and freight costs. Unimodal rail (60%) and road (40%) movements, however, remain more important, on the whole, in import trade (60%).

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* It should be noted that firm officials indicated that to provide statistics on the relative proportion, by value and number of shipments, of automobiles and their parts moving multimodally would have necessitated a detailed study for which they had neither the time nor resources.

In terms of automobile parts, the concensus was that almost all components (99%) moving in transborder import or export trade still move unimodally either by rail or road with rail still dominating.

It should be noted that the estimates provided by this firm for multimodal movements, as a proportion of total movements in both import and export trade for both automobiles and components, may be underestimates as a result of confusion related to the concept of pick-up and delivery in the context of this firm's transport operations. In the case of rail movements, it is impossible to move finished vehicles and components to the dealer without using road transport. Consequently, in many cases, trucks must be used to get cars and components to the dealer from the drop-off point regardless of whether the dealer is a few miles or several hundred miles from this point. As often as possible, drop-off points (for the rail mode) are located as close to the market as is expedient. This leads to the question of whether or not such truck movements, involving such a minute portion of the total distance over which these commodities are transported, should be considered as transport "incidental" to the main mode or as an additional mode.

In an effort to obtain an idea of the magnitude of the monetary value of automobiles and parts, produced by this firm, that move multimodally in transborder export and import trade, 1979 sales figures* were used to determine the firm's relative proportion of the total production of automobiles and their parts. This proportion was then applied to the total value figures for exports and imports of automobiles and their parts found in Statistics Canada's Merchandise Trade publications. To the ensuing value, attributed only to this firm, were applied the percentages supplied by the firm pertaining to the ratio of multimodal transport to total movements. In this way an "estimate" of the total value of automobiles and their parts produced by this firm and moving multimodally was obtained. Results indicate that some 1.2 billion dollars in imports and 907 million dollars in exports of automobiles and their parts, attributed only to this firm, moved multimodally in 1979. Of course, following upon the explanation pertaining to possible underestimates of the above totals due to the problem of defining pick-up and delivery services in the context of the firm's operations, it may be that these figures could range as high as 3.8 billion dollars on the export side and 4.8 billion dollars on the import side.

Finally, one automobile manufacturer contacted provided the study team with estimates, by value and number of shipments, of its automobiles and their parts which were moved by more than one mode of transport in 1979. According to the firm's figures, 144 000 shipments with a corresponding value of 960 million dollars, accounting for 60 percent (by value and number of shipments) of total export shipments of automobiles in 1979 were transported by truck-rail combinations. Exported components, totalling 14 000 shipments with a corresponding value of 72 million dollars moved exclusively unimodally.

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* It is assumed that sales figures generally reflect relative differences in the total value of export and import trade which could be attributed to individual companies producing these types of commodities. Consequently, individual firms' proportions of total sales were applied to export and import values for transborder trade only to yield estimates of the value of export and import trade attributed to an individual firm. [2, p.296]

On the transborder import side, 145 000 of 190 000 shipments of automobiles with a corresponding value of 1.2 billion dollars (76% of total value) moved multimodally via truck-rail combinations in 1979. Of all components moved by this firm in transborder import trade in the same year, only 8 000 of 90 000 shipments with a value of 113 million dollars (10% of total value) moved multimodally.

7.3 Aggregate Trade in Automobiles and their Parts Moved Multimodally in 1979

Combining all of the information provided by the three responding firms, it would appear that at the very minimum 2.5 billion dollars of a total of 13.6 billion dollars in imports and 1.9 billion dollars of a total of 10.7 billion dollars in exports of automobiles and their parts were transported by more than one mode in 1979. However, it is probable that these figures could be as high or slightly higher* than 4.8 billion dollars for imports and 3.8 billion dollars for exports if the definition of pick-up and delivery services, as it pertains to transport operations of automobile manufacturers, was further clarified in the MT Convention. In conclusion, a very rough estimate would place the proportion of the value of automobiles and their parts moving multimodally in Canadian transborder import trade between at least 18 percent and 35 percent of the total value of the trade. The comparable range for Canadian transborder export trade would be between 18 percent and 36 percent.

However, a key factor which may render insignificant any attempt to determine the extent of the use of multimodal transport in the movement of automobiles and their parts, in assessing the overall impact of a Convention on the International Multimodal Transport of Goods, is the tight control over the movement of their products which most automobile manufacturers maintain. Because of the nature of their business, most car manufacturers must know where specific shipments are at all times in the event that there is an immediate "unscheduled" need for a shipment or a portion thereof. Despite their use of for-hire carriers, these firms have managed to develop a system that can accommodate these spontaneous demands. Therefore, when a shipment is required, it can be quickly located by the firm's personnel and its routing pattern altered to assure its accelerated arrival to satisfy an immediate need. Under an MT Convention, and assuming automobile manufacturers' use of an MTO, it appears likely that they would lose this "flexibility" which their present transport system provides. Once goods were placed in charge of the MTO it would be the MTO's decision as to the modes of transport to be used, routing patterns etc., and it seems unlikely that an MTO would be able to accommodate a shipper's unscheduled needs for accelerated delivery of a shipment from time to time. As a result these firms see little benefit for them in such a Convention.

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* Defining an approximate range for the proportion of automobiles and their parts transported multimodally in 1979 transborder export and import trade is impossible as one of the major automobile manufacturers who responded did so in a manner which did not permit the study team to estimate the position of their production moving multimodally and combine it with figures from the other firms to estimate a definitive total. As well, some firms contacted, although accounting for a very small proportion of the total production of such commodities, did not respond.

Chapter 8

CONCLUDING REMARKS

8.1 Canadian Transborder Trade

Having analyzed those estimates pertaining to the use of multimodal transport in Canadian transborder trade (excluding the automobile trade), there appears to be little doubt that generally, they give a good indication of the relative extent of use of various modal combinations. On the other hand, the same cannot be said for the information provided on Canadian transborder imports and exports of automobiles and their parts, as the study team relied primarily on the major producers of these commodities for the pertinent data and assumed, on their part, a correct interpretation of the objectives and concepts germane to the study. At best, the very general data presented in Chapter 7, dealing specifically with these commodities, can only be viewed as giving the reader a crude indication of the use of multimodal transport in their movement.

In general, transborder estimates would appear to be more reasonable and reliable* than overseas estimates because the task of reconstructing the actual movements between two contiguous land masses where pick-up and delivery services and incidental transport proved to be less of a factor, was much easier.

8.2 Canadian Overseas Trade

Confidence, similar to that expressed above for transborder estimates, in results pertaining to the use of multimodal transport in Canadian overseas trade cannot be expressed in such an unqualified manner. Keeping with a purely theoretical definition of multimodal transport, one would have to conclude that close to 100 percent of all Canadian overseas exports and imports move multimodally, assuming, for a moment, that pick-up and delivery services constitute an additional mode, and that all producers, manufacturers and consumers of imports and exports are not specifically located at the wharf or airport. However, when one attempts to mirror the definition of multimodal transport stipulated in the Convention on International Multimodal Transport of Goods in an effort to legitimately estimate that portion of trade which would have qualified in 1979 for carriage under the rules and regulations of such a Convention, one must then eliminate, from the multimodal category, those movements (previously defined as multimodal) where pick-up or delivery services have been provided or where the producer, consignee or their agents have contracted with an

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* This greater reliability resulted from more familiarity with transborder trade and was aided considerably by the fact that only two modes of transport dominated transborder movements.

independent mode to move the goods to or from the airport or wharf. As a result, considerably fewer movements would then be considered to be multimodal, as perceived in the Convention. It was the measurement of these movements which was viewed as the major objective of this study.

In the opinion of the study team, estimates presented in the text give a good indication of the use of multimodal transport in Canadian international trade and could conceivably provide a viable basis for any assessment of the impact of the Convention in a Canadian context. There nevertheless remain some questions regarding the theoretical interpretation of the concept of multimodal transport and that defined in the Convention. Indeed this concept and its variants raise the prospect of further confusion. Should the Convention enter into force, the Multimodal Transport Operator may perceive it to be in his best interest to include a greater portion of the goods he oversees within the framework of such legislation and thus would be tempted to designate unimodal movements with pick-up and delivery portions (not perceived as being governed by the Convention) as multimodal movements.

Also, the fact that the option of moving goods, whether in a traditional segmented manner or multimodally, still remains with the shipper or consignee himself, presents a scenario which should make any more refined assessment of the impact of the Convention on the International Multimodal Transport of Goods an extremely difficult proposition.

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Appendix A

BULK EXPORT COMMODITIES AND OTHERS EXCLUDED FROM THE SAMPLE

X.C.C. Code	Commodity
00185	cattle, n.e.s.* (451 to 700 lbs.**)
00630	baby chicks**
00999	live animals, n.e.s.**
04443	canned salmon**
06119	barley
06124	buckwheat
06129	corn (maize), shelled
06131	oats, seed
06133	mixed feed oats, oat scalpings
06139	oats, n.e.s.
06159	rye
06161	white winter seed wheat
06162	seed wheat, n.e.s.
06164	red spring wheat, except seed
06165	durum wheat, except seed
06167	white winter wheat, except seed
06168	Alberta winter wheat, except seed
06169	wheat, except seed, n.e.s.
06199	cereals, unmilled, n.e.s.
15239	hulls, screenings, chaff, scourings
15259	oat by-products, n.e.s.
15269	wheat bran, shorts and middlings
15399	oil seed cake and meal, n.e.s.
15515	alfalfa, dehydrated
15560	rapeseed screenings
21230	flaxseed
21240	rapeseed
21299	oil seed, oil nuts, oil kernels, n.e.s.
21699	rubber and allied gums, natural
23637	pulpwood, balsam fir, spruce, peeled
23829	pulpwood chips
25104	iron ore, direct shipping grade
25108	iron ore, concentrated
25710	zinc in ores and concentrates
26169	coal
26410	crude petroleum
26431	natural gas
26499	crude bituminous substances, n.e.s.
27249	clays, ground or unground
27549	sand and gravel
27649	building stone, rough
27699	stone, crude, n.e.s.
27940	gypsum
27977	sulphur, crude or refined, n.e.s.
27999	non metallic minerals, crude, n.e.s.
33140	lumber, douglas fir & western larch**
39126	tallow
39199	animal oils and fats, n.e.s.
39299	fish and marine animal oil, n.e.s.
39328	flaxseed or linseed oil

* Not elsewhere specified.
** Eliminated as "outliers".

X.C.C. Code	Commodity
39356	rapeseed oil
39360	soya bean oil
40299	inorganic bases and metallic oxides, n.e.s.
40499	metallic salts of inorganic acids, n.e.s.
41652	potassium chloride, muriate
43199	gasoline
43249	fuel oil, nos. 1-3 stove, furnace, light
43259	fuel oil, heavy, nos. 4-6 and bunker
43269	fuel oil, n.e.s.
43399	lubricating oils and greases
43530	petroleum coke and pitch coke
43549	coke, n.e.s.
43909	refined asphalts and road oils
43941	coal tar and coke pitch
43963	propane gas, liquefied
43999	petroleum and coal products, n.e.s.
49704	electricity**
50739	air and gas compressors and parts**
58103	cars, 100 cu. ft. int. vol., new***
58105	cars 100 - 110 cu. ft. int. vol., new***
58107	cars 110 - 120 cu. ft. int. vol., new***
58109	cars 120 cu. ft. and over, int. vol., new***
58133	station wagons, new***
58149	passenger automobiles, n.e.s., and chassis***
58304	trucks and chassis, not over 6 000 lbs.***
58499	trailers and commercial semi-trailers***
58729	buses and bus chassis***
58742	snowmobiles, pleasure & sports & parts***
58799	motor vehicles, n.e.s.***
58885	motor vehicle engines and parts***
58999	parts and accessories for motor vehicles, n.e.s.
96161	gold coin**
97010	export packing, re-usable or unclass.
97020	contractors equipment and tools
97075	shipments of less than 500 $ each
	Non-Trade Items
99065	current coin, n.e.s.
99510	settlers' effects
99512	private donations & gifts
99514	identifiable tourist purchases
99581	exports to Canadian Diplomats and forces
99583	exports for exhibit or competition
99585	motion picture film not sold or exposed
99589	photo film, not sold or exposed, n.e.s.

Note: All re-exports were eliminated from the sample.

*** Not included in the sample of transborder trade but treated in Chapter 7.

Appendix B

BULK IMPORT COMMODITIES AND OTHERS EXCLUDED FROM THE SAMPLE

Commodity Class	Commodity Description
06144	rice, uncleaned, unhulled or paddy
10119	raw sugar
10170	molasses, cane or beet
15290	ground cereals and by-products
15599	feeds of vegetable origin, n.e.s.*
21299	oil seeds, oil nuts, oil kernels, n.e.s.*
21610	latex, natural crude
25120	iron ore
25210	bauxite ore
25230	alumina
25339	copper in ores and concentrates
25599	nickel in ores, concentrates and scrap
25799	zinc in ores, concentrates and scrap
25925	chrome in ores and concentrates
25940	manganese in ores and concentrates
26110	anthracite peas, beans and small sizes
26115	anthracite, domestic sizes
26149	coal, bituminous and sub-bituminous
26410	crude petroleum and petroleum condems
26431	natural gas
26432	asphalt, natural
26499	crude bituminous substances, n.e.s.
27220	china clay, ground or unground
27249	clays, ground or unground, n.e.s.
27549	sand and gravel, n.e.s.
27649	building stone, rough, n.e.s.
27674	crushed limestone, limestone refuse
27679	crushed stone including stone refuse, n.e.s.
27699	stone, crude, n.e.s.
27910	chryolite, natural
27940	gypsum
27965	phosphate rock
27980	talc or soapstone
27985	vermiculite, crude
39111	animal grease, n.e.s.
39126	tallow
39199	animal oils in fats, n.e.s.
39308	castor oil
39312	china wood oil or tung oil
39316	coconut oil
39344	palm oil
39348	palm kernel oil
39360	soya bean oil
39935	pine oil, pine tar and pine pitch
42210	latex, synthetic, crude, n.e.s.
43109	aviation gasoline
43149	motor gasoline, n.e.s.
43209	aviation turbine fuel
43219	diesel and tractor fuel
43225	kerosene, n.e.s.
43240	fuel oil, no. 1, stove oil
43245	fuel oil, nos. 2 and 3
43259	fuel oil, n.e.s., heavy fuel oil

* Not elsewhere specified.

Commodity Class	Commodity Description
43329	cutting, penetrating and lub. oils
43349	lubricating greases
43909	refined asphalts and road oils
43929	refined mineral oils, n.e.s.
43941	coal tar and coal pitch
43965	liquefied petroleum gases
43995	petroleum products, n.e.s., except chemicals
45940	manganese
49704	electricity
58101	cars, two seaters, new**
58102	cars < 85 cu. ft. int. vol., new**
58103	cars 85 to < 100 cu. ft. int. vol., new**
58104	convertible automobiles, soft top, new**
58105	cars, 100 to < 110 cu. ft. int. vol., new**
58107	cars, 110 to < 120 cu. ft. int. vol., new**
58109	cars 120 cu. ft. and over int. vol., new**
58133	station wagons, new**
58149	passenger autos, n.e.s., and chassis**
58304	trucks and chassis M6VW, 6 000 lbs., new**
58329	trucks and chassis, commercial, new, n.e.s.**
58338	trucks and truck tractors, used**
58447	truck trailers and semi-trailers, new**
58448	truck trailers and semi-trailers, used**
58465	mobile homes
58466	travel trailers
58467	tent trailers/tent campers
58499	trailers, n.e.s.
58729	buses and bus chassis**
58730	motorcycles
58733	powercycles and motor scooters
58737	parts and accessories for motorcycle, powercycle
58742	snowmobiles, pleasure and sports & parts
58769	off-highway tracks
58779	motor vehicles, electric powered, n.e.s.**
58799	motor vehicles, n.e.s.**
58802	snowmobile engines
58804	motor vehicle engines, diesel**
58819	motor vehicle engines, n.e.s.**
58834	parts of motor vehicle diesel engines**
58849	parts of motor vehicle engines, n.e.s.**
58909	bodies and cabs for trucks and trailers**
58910	trailer hitches, couplings and parts**
58912	windows and vents for trailers**
58919	parts of trailers, n.e.s.**
58935	jacks from motor vehicles and parts**
58940	mirrors for motor vehicles**
58999	parts and accessories for motor vehicles, n.e.s.**
96139	wood and products, n.e.s.
96161	gold coin***
97010	packing, non-reusable
97030	goods returned within 5 years
97075	shipments of less than 500 $ each
97090	unclassifiable imports

** Eliminated from the sample of transborder trade but treated in Chapter 7.
*** Eliminated as an outlier.

Appendix C

SAMPLES OF CUSTOMS DOCUMENTS USED AS SOURCES OF INFORMATION IN THE STUDY

B 13 CANADA CUSTOMS EXPORT DECLARATION

SEE CUSTOMS MEMORANDUM D22-1 AND STATISTICS CANADA EXPORT COMMODITY CLASSIFICATION

1 EXPORTER

2 REPORT NO.

3 SHIPPER'S REF. NO.

4 PAGE OF PAGES

5 CONSIGNEE

6 STAMP OF CHIEF PORT

RE EXPORTS – INDICATE COUNTRY OF ORIGIN INDIVIDUALLY IN LEFT HAND MARGIN

7 CTRY. OF FINAL DESTINATION

11 TERMS OF DELIVERY AND PAYMENT

12 IF FOREIGN GOODS IN SAME CONDITION AS IMPORTED GIVE COUNTRY OF ORIGIN

8 LOCAL CARRIER

9 FROM (LOCAL POINT OF LADING)

10 EXPORTING CARRIER

13 MARKS AND NUMBERS	14 NUMBER AND TYPE OF PACKAGES: DESCRIPTION OF GOODS, GIVE SUFFICIENT DETAIL TO PERMIT CODING ACCORDING TO STATISTICS CANADA EXPORT COMMODITY CLASSIFICATION.	15 QUANTITY IN UNIT REQUIRED FOR EXPORT COMMODITY CLASSIFICATION	16 CURRENCY OF VALUE 17 SHIPPING WEIGHT	18 UNIT PRICE	19 INVOICE VALUE

20 (IF APPLICABLE) ARE/WERE THE GOODS SUBJECT TO DRAWBACK ☐ IMPORTED ON 1/60TH BASIS ☐ IMPORTED UNDER LICENCE ☐

21 EXPORT PERMIT NO.

22 ESTIMATED FREIGHT CHARGES TO PORT OF EXIT $ ..... OR TO DESTINATION $ .....

25 IF GOODS NOT SOLD STATE REASON FOR EXPORT, (LOAN, REPAIR, PROCESSING ETC.)

23 MODE OF TRANSPORTATION FROM POINT OF EXIT
ROAD ☐ RAIL ☐ WATER ☐ AIR ☐ OTHER ☐

24 CONTAINERIZED
YES ☐ NO ☐

I HEREBY CERTIFY THAT THE INFORMATION GIVEN ABOVE AND OR THE CONTINUATION SHEET(S), IF ANY, IS TRUE AND COMPLETE IN EVERY RESPECT

27 GIVE FIRM NAME AND ADDRESS IF DIFFERENT FROM EXPORTER BOX ABOVE .....

28 DATE .....

29 SIGNATURE

30 STATUS
OWNER ☐ AGENT ☐

26 RETURN ADDRESS

B 13
4/78

REVENUE CANADA
CUSTOMS AND EXCISE

REVENU CANADA
DOUANES ET ACCISE

CANADA CUSTOMS INVOICE

PAGE ____ PAGES ____ OF

1 VENDOR (NAME & ADDRESS)

2 DATE OF DIRECT SHIPMENT TO CANADA

3 INVOICE NO AND DATE

4 OTHER REFERENCES (INCLUDE PURCHASER'S ORDER NO.)

5 CONSIGNEE (NAME & ADDRESS)

6 PURCHASER (IF OTHER THAN CONSIGNEE AND/OR IMPORTER)

8 IMPORTER (NAME & ADDRESS)

7 COUNTRY OF ORIGIN OF GOODS

IF SHIPMENT INCLUDES GOODS OF DIFFERENT ORIGINS ENTER ORIGINS AGAINST ITEMS NO 16

10 TRANSPORTATION GIVE MODE AND PLACE OF DIRECT SHIPMENT TO CANADA

9 CONDITIONS OF SALE & TERMS OF PAYMENT

E.G. SALE, CONSIGNMENT SHIPMENT, LEASED GOODS, ETC./WHETHER PRICES ARE F.O.B., C.I.F., DUTY PAID, ETC./DETAILS OF DISCOUNTS AND OTHER SPECIAL ARRANGEMENTS.

11 CURRENCY OF SETTLEMENT

12 MARKS & NUMBERS	13 NO. & KIND OF PACKAGES	14 GENERAL DESCRIPTION OF CONTENTS	15 TOTAL WEIGHT NET	GROSS

16 SPECIFICATION OF COMMODITIES (CHARACTERISTICS E.G. GRADE, QUALITY, SIZE, ETC.)	17 QUANTITY (STATE UNIT)	18 FAIR MARKET VALUE / AMOUNT	SELLING PRICE TO PURCHASER IN CANADA (IF ANY) 19 UNIT PRICE	20 AMOUNT

21 WE CERTIFY THIS INVOICE TO BE TRUE AND CORRECT AND TO THE BEST OF OUR KNOWLEDGE IN CONFORMITY WITH CANADIAN CUSTOMS LAWS	CHARGES	SPECIFY CURRENCY	STATE IF INCLUDED IN 18	STATE IF INCLUDED IN 20	AMOUNT
NAME OF SIGNATORY (PRINT)	22 Export Packing				
	23 Freight from place of direct shipment to Canada				
TITLE	24 Freight and insurance to place of direct shipment in Canada				
PLACE AND DATE OF ISSUE	25 Insurance from place of direct shipment to Canada				
SIGNATURE	26 Royalties				
	Commissions and Broker Charges				
27 EXPORTER'S NAME AND ADDRESS (IF OTHER THAN VENDOR)	Other charges (specify)				

28 VALUATION RULING – DEPARTMENTAL FILE REFERENCE AND DATE (IF APPLICABLE)

29 IF CONTINUATION SHEETS ARE USED ENTER TOTAL FIGURES HERE →	FAIR MARKET VALUE	SELLING PRICE

CI 1 (7/79) SEE REVERSE SIDE FOR GENERAL INFORMATION ON RULES OF ORIGIN AND FAIR MARKET VALUE. FOR MORE DETAILED INSTRUCTIONS FOR COMPLETING THIS INVOICE REFER TO CANADA CUSTOMS MEMORANDUM D13

RULES OF ORIGIN

Country of Origin means the country of which the invoiced goods are bona fide the growth, produce or manufacture. In their present form ready for export, the goods must have been finished in the country specified as the country of origin.

In addition, there is a "not less than one-half the cost of production requirement" for the qualification for entry under the British Preferential Tariff and Most-Favoured-Nation Tariff.

For goods seeking entry under the British Preferential Tariff, not less than one-half of the cost of production of each such article must have been incurred through the industry of one or more countries entitled to the British Preferential Tariff. The British content requirement of "one-half" has been modified in the case of a small number of commodities which are mentioned in Canada Customs Memorandum D-36.

For goods seeking entry under the Most-Favoured-Nation Tariff, not less than one-half the cost of production must have been incurred through the industry of countries entitled to the benefits of the Most-Favoured-Nation Tariff or the British Preferential Tariff.

In the calculation of cost of production for determining the qualification for entry under the British Preferential Tariff or Most-Favoured-Nation Tariff, none of the following items are to be included or considered, viz:

(i) Outside packages and expenses of packing thereinto
(ii) Manufacturer's or Exporter's profit and the profit or remuneration of any trader, broker, or other person dealing in the article in its finished manufactured condition.
(iii) Royalties
(iv) Customs or Excise duty or tax paid or payable on imported materials
(v) Carriage, insurance, etc., from place of production or manufacture to port of shipment
(vi) Any other charges incurred or to be incurred subsequent to the completion of the manufacture of the goods.

Different rules apply for goods seeking entry under the General Preferential Tariff and a Certificate of Origin Form A is required Information regarding the General Preferential Tariff may be obtained from Customs Memorandum D47-518-3.

FAIR MARKET VALUE

When like goods are sold in the country of export:-

The value to be placed in the fair market value column shall be the invoiced price at which like goods are freely sold for home consumption in the country of export to customers with whom the vendor deals at arms' length.

When only similar goods are sold in the country of export:-

The value to be placed in the fair market value column shall be the sum of the cost of production of the goods shipped to Canada plus a percentage advance which is equal to the percentage markup over production cost included in the fair market value of similar goods when sold for home consumption in the country of export to customers with whom the vendor deals at arms' length.

When establishing fair market value on the basis of sales of like or similar goods, the following rules apply:-

1. Except as provided in (2) below, the only discounts or deductions allowed are those which are shown, allowed and deducted on invoices covering sales for home consumption in the ordinary course of trade. In particular, subsidies, rebates and exemption from or drawback of any Customs duty may not be used to reduce fair market value.

2. Commodity taxes levied on like or similar goods within the country of export may be deducted from the fair market value providing the goods shipped to Canada have been or will be exempted or relieved from such taxes. The amount should be shown as a deduction from the fair market value, with appropriate notation.

3. Fair market value must reflect sales prices in the country of export to purchasers located at the place of direct shipment to Canada, or as near thereto as possible, who are the same or substantially the same trade level as the importer, or at the next and subsequent trade level. The place of direct shipment is the place where the goods begin their continuous journey to Canada.

4. Fair market value must reflect sales prices in effect at the time of shipment to Canada or those made most recently prior thereto, and in the same quantities as shipped to Canada or in smaller quantities.

5. Cost of production includes all materials, labour and factory overheads. The costs of the exported goods and of the similar goods sold in the exporting country must be established on the same basis. The costs of the exported goods may not be reduced by any subsidy or by reason of exemption from or drawback of any Customs duty.

6. Where the fair market value is not based on home market sales of like or similar goods it must be determined under other provisions of the Customs Act.

7. Where packing is included in the price at which goods are sold to purchasers in the country of export, like or substitute packing must be included in the invoiced fair market value of the goods. Additional packing for the overseas transportation of the goods may be invoiced separately as export packing.

8. Specific details may be obtained by writing to the Department of National Revenue, Customs and Excise, Connaught Building, Ottawa, Ontario, Canada, K1A 0L5.

Revenue Canada
Customs and Excise

Revenu Canada
Douanes et Accise

CANADA CUSTOMS IMPORT ENTRY CODING FORM

DOUANES DU CANADA - FORMULE DE CODAGE DE DÉCLARATION D'IMPORTATION

1 TYPE TYPE	2 PAGE NO. N° DE PAGE

3 IMPORTER NUMBER NAME, ADDRESS
NUMÉRO NOM ADRESSE DE L'IMPORTATEUR

4 CARGO CONTROL NUMBER
NUMÉRO DE CONTRÔLE DE FRET

5 C.C. QUANTITY
QUANTITÉ C.F

6 ACCOUNT SECURITY NO
N° DE COMPTE GARANTIE

7 PORT
BUREAU

8 ENTRY NO.
N° DE DÉCL.

9 VENDOR NAME
NOM DU VENDEUR

10 INVOICE QUANTITY
QUANTITÉ FACTURÉE

11 CNTRY EXPORT PAYS EXP.

12 CNTRY ORIGIN PAYS ORIG.

13 DIR SHIP EXP DIR

14 TARIFF TREAT TR. TARIF

15 RELEASE NO.
N° MAINLEVÉE

	34 DESCRIPTION DÉSIGNATION	35 SPECIAL AUTHORITY AUTORISATION SPÉCIALE
1		
2	DESCRIPTION DÉSIGNATION	SPECIAL AUTHORITY AUTORISATION SPÉCIALE
3	DESCRIPTION DÉSIGNATION	SPECIAL AUTHORITY AUTORISATION SPÉCIALE
4	DESCRIPTION DÉSIGNATION	SPECIAL AUTHORITY AUTORISATION SPÉCIALE
5	DESCRIPTION DÉSIGNATION	SPECIAL AUTHORITY AUTORISATION SPÉCIALE
6	DESCRIPTION DÉSIGNATION	SPECIAL AUTHORITY AUTORISATION SPÉCIALE

I, _____ of _____

PLEASE PRINT NAME - LETTRES MOULÉES S.V.P. IMPORTER AGENT - IMPORTATEUR AGENT P.A. NUMBER N° DE LA PROCURATION

DECLARE THE PARTICULARS OF THIS ENTRY TO BE TRUE AND COMPLETE AND THAT ANY GOODS ENTERED FREE OR AT A LOWER RATE OF DUTY AND OR TAXES THAN WOULD OTHERWISE BE CHARGEABLE WILL BE USED IN ACCORDANCE WITH THE SPECIFIC PROVISION(S) IN THE TARIFF ITEM(S) UNDER WHICH ENTERED

DÉCLARE QUE LES DÉTAILS DE CETTE DÉCLARATION SONT VRAIS ET COMPLETS ET QUE TOUTES LES MARCHANDISES DÉDOUANÉES EN FRANCHISE, OU À UN PLUS BAS TAUX DE DROITS ET OU DE TAXES QUE CELUI QUI SERAIT AUTREMENT IMPOSÉ SERONT UTILISÉES CONFORMÉMENT À LA OU AUX DISPOSITIONS SPÉCIFIQUES DU OU DES NUMÉROS TARIFAIRES À LA FAVEUR DUQUEL OU DESQUELS ELLES ONT ÉTÉ IMPORTÉES

DATE _____ SIGNATURE _____

B 3
6 76

36 TOTAL F.M.V. TOTAL DE LA J.V.M.	37 CNCY CODE CODE DE DEVISE

TIME LIMIT	38 DÉLAI

IMPORTERS USE ONLY
RÉSERVÉ À L'IMPORTATEUR

CENTRAL PAYMENT PAIEMENT CENTRAL	39
LOCAL PAYMENT PAIEMENT LOCAL	40
HOLD FOR PAYMENT RETENIR POUR PAIEMENT	41

42 DUTY DROIT	
43 SALES TAX TAXE DE VENTE	
44 EXCISE TAX TAXE D'ACCISE	
45 TOTAL TOTAL	

Appendix D

ALLOCATION OF SAMPLED EXPORT AND IMPORT TRANSACTIONS AMONG THE STRATA

TABLE 1A: EXPORTS FROM CANADA TO USA JANUARY 1979

VALUE RANGE	G 1			G 2			G 3			G 4			G 5		
	SS	SI	WT	SS	SI	WT	SS	SI	WT	SS	SI	WT	SS	SI	WT
1000-3000	5	11.80	48.24	5	114.80	469.32	5	25.60	100.66	10	108.50	443.56	10	107.50	439.48
3001-30000	5	154.80	632.84	15	331.80	1356.44	10	322.00	1316.38	100	470.30	1922.65	30	449.10	1635.98
30000 +	5	22.40	91.57	10	111.00	453.78	5	85.40	349.13	10	339.00	1385.88	10	306.10	1251.38
TOTAL	15			30			20			120			50		

TABLE 1B: EXPORTS FROM CANADA TO OTHER COUNTRIES JANUARY 1979

1000-3000	5	4.20	17.17	10	69.40	238.72	5	44.40	181.51	10	72.30	295.57	35	72.71	297.25
3001-30000	5	10.80	44.15	35	73.49	300.44	15	74.93	306.32	50	82.06	335.47	50	83.90	343.00
30000 +	5	4.20	17.17	15	65.07	266.02	10	76.50	312.74	25	75.32	307.92	20	64.10	262.05
TOTAL	15			60			30			85			105		

NOTE: SS = Sample Size
SI = Sampling Interval
WT = Weight

NOTE: These tables were taken from M. Nargundkar's Use of Unimodal/Multimodal Transportation in International Trade.

TABLE 1C: IMPORTS TO CANADA FROM USA

JANUARY 1979

VALUE RANGE	G 1			G 2			G 3			G 4			G 5		
	SS	SI	WT	SS	SI	WT	SS	SI	WT	SS	SI	WT	SS	SI	WT
1000-3000	2	37.00	151.53	5	974.60	3991.56	5	226.00	425.60	15	617.07	2527.26	30	885.57	3626.93
3001-30000	3	114.67	469.64	15	650.60	2664.59	5	912.00	3735.18	40	810.70	3320.20	75	807.79	3316.56
30000 +	2	25.50	104.44	5	153.80	629.90	5	171.20	701.16	5	709.20	2904.59	15	514.87	2108.70
TOTAL	7			25			15			60			120		

TABLE 1D: IMPORTS TO CANADA FROM OTHER COUNTRIES

JANUARY 1979

1000-3000	5	5.40	22.12	10	186.80	765.06	5	59.20	242.46	15	200.00	819.12	60	179.90	736.80
3001-30000	3	2.00	8.19	20	209.40	857.62	5	65.00	266.21	40	185.80	760.96	100	186.21	762.64
30000 +	5	6.60	27.03	10	111.10	455.02	5	47.40	194.12	10	177.20	725.73	20	195.55	800.09
TOTAL	13			40			15			65			180		

NOTE: SS = Sample Size
SI = Sampling Interval
WT = Weight

TABLE 2A: EXPORTS FROM CANADA TO THE U.S.A. JULY 1979

VALUE RANGE	G 1			G 2			G 3			G 4			G 5		
	SS	SI	WT	SS	SI	WT	SS	SI	WT	SS	SI	WT	SS	SI	WT
1000-3000	2	13.50	55.19	5	107.80	440.70	3	38.33	156.70	10	101.90	416.58	10	164.00	670.46
3001-30000	5	118.20	483.22	15	303.67	1241.45	10	239.80	980.34	90	500.03	2044.19	30	516.73	2112.46
30000 +	3	46.00	180.05	10	136.20	556.80	5	97.60	399.00	10	395.10	1615.22	15	281.28	1149.91
TOTAL	10			30			18			110			55		

TABLE 2B: EXPORTS FROM CANADA TO OTHER COUNTRIES JULY 1979

1000-3000	2	7.00	28.62	5	84.40	346.67	5	42.40	173.33	10	68.30	279.22	35	69.54	284 29
3001-30000	2	18.00	73.59	25	69.32	283.39	10	84.40	345.04	60	63.85	261.03	75	60.69	248.11
30000 +	2	12.00	49.06	10	85.70	350.35	10	64.00	261.64	30	67.53	276.07	20	70.40	287.81
TOTAL	6			40			25			100			130		

NOTE: SS = Sample Size
SI = Sampling Interval
WT = Weight

TABLE 2C: IMPORTS TO CANADA FROM U.S.A. JULY 1979

VALUE RANGE	G 1			G 2			G 3			G 4			G 5		
	SS	SI	WT	SS	SI	WT	SS	SI	WT	SS	SI	WT	SS	SI	WT
1000-3000	2	29.00	118.77	10	610.60	2500.77	5	177.80	728.20	15	565.87	2317.57	30	881.50	3610.26
3001-30000	5	81.00	331.74	20	633.45	2594.35	10	436.10	1788.09	35	885.03	3624.72	70	890.71	3647.98
30000 +	2	24.50	100.34	5	160.40	856.93	5	94.40	386.62	10	384.00	1572.71	15	551.60	2259.13
TOTAL	9			35			20			60			115		

TABLE 2D: IMPORTS TO CANADA FROM OTHER COUNTRIES JULY 1979

1000-3000	2	9.00	36.86	10	101.50	415.70	5	36.00	147.44	15	187.27	766.98	60	197.32	808.14
3001-30000	2	10.00	40.96	20	166.65	682.60	4	45.40	185.94	40	180.05	737.41	100	193.80	793.78
30000 +	2	1.00	05.00	10	114.00	466.90	5	45.60	186.76	15	130.87	536.00	25	169.28	693.30
TOTAL	6			40			15			70			185		

NOTE: SS = Sample Size
SI = Sampling Interval
WT = Weight

TABLE 3A: EXPORTS FROM CANADA TO THE U.S.A. NOVEMBER 1979

VALUE RANGE	G 1			G 2			G 3			G 4			G 5		
	SS	SI	WT	SS	SI	WT	SS	SI	WT	SS	SI	WT	SS	SI	WT
1000-3000	3	35.00	143.08	5	243.60	995.87	5	195.40	798.82	10	297.80	1217.45	10	292.00	1193.74
3001-30000	5	190.40	770.38	10	550.8	2251.75	10	367.80	1503.62	90	532.99	2178.94	35	548.03	2240.42
30000 +	3	103.00	421.08	5	265.40	1085.00	3	178.00	727.69	10	492.30	2012.59	10	454.00	1856.42
TOTAL	11			20			18			110			55		

TABLE 3B: EXPORTS FROM CANADA TO OTHER COUNTRIES NOVEMBER 1979

1000-3000	3	3.66	14.96	10	70.2	286.99	5	38.60	157.80	40	79.90	326.64	40	79.45	324.80
3001-30000	3	15.33	62.67	35	78.51	320.96	10	88.10	360.17	50	79.82	326.32	70	80.45	330.73
30000 +	3	10.66	43.58	15	78.26	319.93	10	65.20	266.55	25	85.64	350.11	20	82.05	337.27
TOTAL	9			60			25			85			130		

NOTE: SS = Sample Size
SI = Sampling Interval
WI = Weight

TABLE 3C: IMPORTS TO CANADA FROM U.S.A. NOVEMBER 1979

VALUE RANGE	G 1			G 2			G 3			G 4			G 5		
	SS	SI	WT	SS	SI	WT	SS	SI	WT	SS	SI	WT	SS	SI	WT
1000-3000	5	15.40	63.07	15	351.00	1437.55	10	105.50	432.08	20	648.50	2655.99	35	1042.66	4270.31
3001-30000	10	47.50	194.54	20	539.00	2207.52	15	327.82	1342.82	30	1088.10	4456.41	60	1081.93	4431.14
30000 +	2	9.00	36.86	10	104.50	427.99	10	85.40	349.76	15	310.40	1271.27	20	458.85	1879.26
TOTAL	17			45			35			65			115		

TABLE 3D: IMPORTS TO CANADA FROM OTHER COUNTRIES NOVEMBER 1979

1000-3000	2	11.00	45.05	10	138.70	568.06	5	56.20	230.17	15	201.33	824.56	60	220.35	902.46
3001-30000	2	10.00	40.96	25	165.16	676.43	5	53.20	217.89	35	208.69	854.71	100	197.17	807.53
30000 +	0	0	0	10	139.90	572.97	5	43.00	176.11	10	205.80	842.87	20	191.40	783.90
TOTAL	4			45			15			60			180		

NOTE: SS = Sample Size
SI = Sampling Interval
WT = Weight

Appendix E

STATES COMPRISING REGIONS OF THE UNITED STATES USED IN THE PRESENTATION OF RESULTS

Region and State	External Trade Code
NORTHWEST	
Washington	95
Oregon	94
Montana	85
Idaho	84
Utah	88
Alaska	92
Wyoming	89
Colorado	83
NORTHEAST	
Maine	13
New York	20
Vermont	17
New Hampshire	15
Maryland	55
New Jersey	22
Connecticut	12
Massachusetts	14
Rhode Island	16
Delaware	52
Pennsylvania	24
SOUTHWEST	
Hawaii	93
California	90
Nevada	86
Arizona	82
New Mexico	87
Texas	75
MIDWEST	
Oklahoma	74
Kansas	43
Nebraska	46
Iowa	42
Arkansas	72
North Dakota	47
South Dakota	48
Missouri	45
NORTH CENTRAL	
Michigan	30
Illinois	32
Indiana	33
Wisconsin	35
Minnesota	44
Ohio	34

Region and State	External Trade Code
SOUTHEAST	
Florida	53
Georgia	54
North Carolina	56
South Carolina	57
Virginia	58
West Virginia	59
Alabama	62
Kentucky	63
Mississippi	64
Tennessee	65
Louisiana	73
Washington, D.C.	50

Appendix F

COUNTRIES COMPRISING COUNTRY BLOCS
USED IN THE PRESENTATION OF RESULTS

Country Bloc/Country	Numeric Code
EUROPE	
United Kingdom	101
Gibraltar	115
Ireland, Rep.	117
Malta	119
Austria	143
Belgium/Luxembourg	144
Denmark	149
Finland	153
France	154
Germany, West	155
Greece	159
Iceland	163
Italy	167
Netherlands	173
Norway	176
Portugal	178
Spain	182
Sweden	185
Switzerland	186
SOVIET BLOC	
Albania	242
Bulgaria	245
Czechoslovakia	246
Germany, East	258
Hungary	262
Poland	277
Romania	279
U.S.S.R./Russia	287
Yugoslavia	288
MIDDLE EAST AND EASTERN AFRICA	
Bahrain	313
Cyprus	316
Qatar	323
U. Arab Emirates	328
Ethiopia	344
Iran	347
Iraq	352
Israel	355
Jordan	358
Kuwait	359
Lebanon	363
Libya	366
Oman/Muscat	368
Saudi Arabia	369
Somalia	374
Yemen, Southern	375
Sudan	377
Syria	379
Turkey	382
Egyptian Arab Rep.	385
Yemen, Northern	386
AFRICA	
Gambia, The	413
Ghana	414
Kenya	415
Malawi	416
Mauritius, Dep.	417
Nigeria	418
South Africa	419
Namibia	420
Rhodesia, South	422
Sierra Leone	423
Tanzania	425
Uganda	426
Zambia/Rhodesia - N/	428
Botswana	430
Lesotho	431
Ngwane/Swaziland	432
St. Helena I.	433
Br. Ind. Ocean Terr.	434
Seychelles	435
Algeria	443
Angola	446
Cameroon Rep.	447
Burundi	448
Zaire	449
Central African R.	450
Chad	451
Congo/Brazzaville	452
Mali	453
Niger	454
Benin/Dahomey	455
Rwanda	456
Upper Volta	457
Reunion I.	458
Afars & Issas	459
Comoro Islands	460
Fr. S. & Antarc. Terr.	461
Gabon	463
Guinea, Rep.	465
Ivory Coast	466
Liberia	468
Madagascar, Rep.	469
Mauritania	472
Morocco	473
Guinea/Bissau	475
Mozambique	476
Cape Verde Islands	477

Country Bloc/Country	Numeric Code
AFRICA (Cont'd)	
SaoTome/Principe I.	478
Equatorial Guinea	480
Canary Is.	481
Senegal	482
Spanish N. Africa	483
Spanish Sahara	485
Togo	486
Tunisia	487
ASIA	
Bangladesh	512
Sri Lanka	513
Maldive Is.	514
Hong Kong	516
India	519
Malaysia	524
Pakistan	527
Singapore	528
Afghanistan	542
Bhutan	544
Burma	545
Khmer Rep.	548
Laos	549
Mongolian People's R.	552
People's R. China	553
Indonesia	556
Japan	559
Korea, North	563
Korea, South	564
Nepal	565
Philippines	567
Portuguese Asia	575
Taiwan	578
Thailand	583
Vietnam	586
PACIFIC ISLANDS	
Cocos/Keeling/Is.	610
Nauru I.	611
Norfolk I.	612
Papua/New Guinea	613
Australia	614
Fiji	617
Tokelau Is.	619
Niue Is.	620
Cook Is.	621
New Zealand	622
Solomon Is., South	623
Christmas I./Pac. O	624
Gilbert & Ellice I.	625
Pitcairn I.	626
Tonga Is.	627
Western Samoa	628
Wallis & Futuna Is.	651
New Hebrides Is.	652
New Caledonia I.	653
French Polynesia	654
Guam I.	666
American Samoa	667
U.S. Pac. Trust Terr.	668
SOUTH AMERICA	
Guyana	716
Falkland Is.	719
Argentina	744
Bolivia	747
Brazil	752
Colombia	758
Ecuador	763
French Guiana	766
Paraguay	769
Peru	774
Surinam	777
Uruguay	782
Venezuela	785
Chile	755
MEXICO, CENTRAL AMERICA AND WEST INDIES	
Bahamas	813
Bermuda	815
Belize	817
Barbados	822
British Virgin Is.	823
Jamaica	824
Leeward and Windward Is.	826
Turks & Caicos Is.	827
Trinidad/Tobago	828
Costa Rica	845
Cuba	848
Dominican Rep.	855
El Salvador	857
Fr. West Indies	862
Guatemala	864
Haiti	867
Honduras, Rep.	869
Mexico	874
Neth. Antilles	876
Nicaragua	879
Panama, Republic	883
Panama, Canal Zone	884
Puerto Rico	886
U.S. Virgin Is.	887